Cristie Bare Machine Recovery for IBM Tivoli

User Guide

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1 Overview

1.1 Context

This document describes the essential elements of TBMR and Disaster Recovery based upon a tailored WinPE recovery module. It is based upon version 6.1.1 of the software.

1.2 Prerequisites

An Intel i386 or EMT-64 based processor, with 512MB RAM and 20MB free disk space running one of the following operating systems:

- Windows 2000 (SP4)
- Windows XP
- Windows 2003
- Windows Vista
- Windows 2008

Both 32 and 64-bit versions of XP, 2003, Vista and 2008 (including Core) are supported.

TBMR requires a minimum TSM client version of 5.3.2.0. This must be installed and correctly configured prior to the installation of TBMR.

Ensure that either the BA Client Open File Support (client version 5.3.x.x) or Logical Volume Snapshot Agent (client version 5.4.x.x onwards) is installed and configured correctly. This allows important OS files that are normally held open by the OS to be successfully backed up by TSM. TBMR will not successfully recover the OS without these files.

1.3 Backup Process

Cristie Bare Machine Recovery for IBM Tivoli (TBMR) allows you to perform a bare machine recovery of your system direct from an IBM Tivoli Storage Manager (TSM) backup.

To do this you must first prepare your system using the process outlined below.

1 Installation (refer to the TBMR Installation and Licensing Guide)
   - Install the TBMR configuration software
   - License the Software (using a Trial or Full license)Using a TSM Backup for Disaster Recovery (page 8, page 4, page 6)

2 Configuration
   - Save the Configuration parameters. Update when significant hardware changes are made.
   - Ensure that you have a bootable media (normally the WinPE DR CD-ROM).

3 Backup system and user data
   - Perform regular standard TSM backups (page 6) as required.

You will then be ready to *Restore the system from the Disaster Recovery Backup (page 8).*

1.4 Recovery Process

In the event of a disaster, having previously taken a TSM backup of the system and stored the configuration information, Windows PE mode DR enables you to restore your system to the state at the last TSM backup.

The TBMR recovery console is supplied on CD-ROM and if your machine supports bootable CD-ROMs (most PCs do) this is the most convenient way to boot the DR module. If the system does not support bootable CD-ROMs you can boot from the network. Contact Cristie for details on how to set this up.

Windows PE offers several advantages namely:

- a familiar Windows GUI
- the ability to inject new mass storage drivers during the boot process
- all variations of dynamic disks are supported (i.e. mirrored, spanned, striped and RAID-5)
- NTFS volumes/partitions are created natively
- support for NTFS mounted folders (junctions) and hard links
- the restored backup contains the original file security information

The WinPE recovery process has 5 main steps

1 Load Configuration data

2 Rebuild storage devices (hard disks)

3 Restore OS files from a TSM backup

4 Dissimilar Hardware (if necessary)

5 Boot into Windows

2 The TBMR Create Configuration Tool

Configuration information is saved by default to the TBMRCFG folder on the Windows system partition. This cannot be changed.

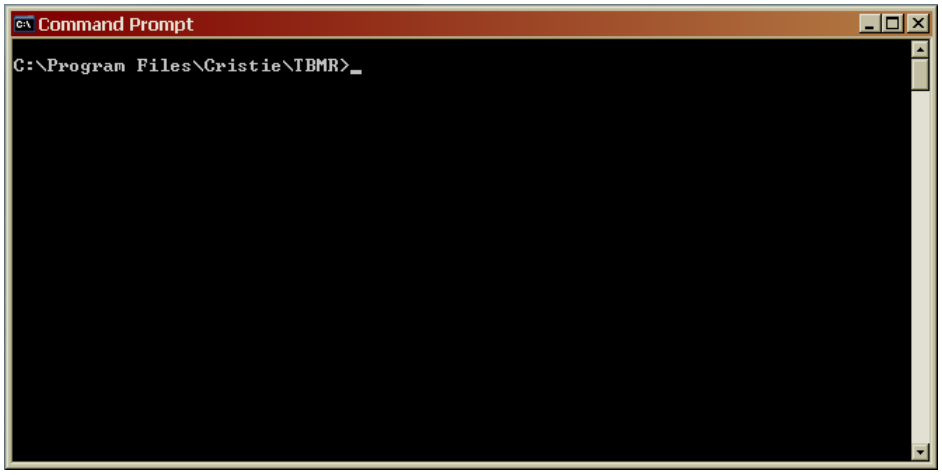
The Cristie tool that provides this function is called TBMRCfg.exe which is located in the TBMR installation folder (normally *Program Files \Cristie\TBMR*). This is a command line only tool which is licensed for use initially for a 30 day trial period. A full license is required to use the program beyond the trial period.

As part of this process, details about the hard disks, operating system, storage controller(s), network adapter(s) and network settings will be queried and stored. You can override some of these details if you wish.

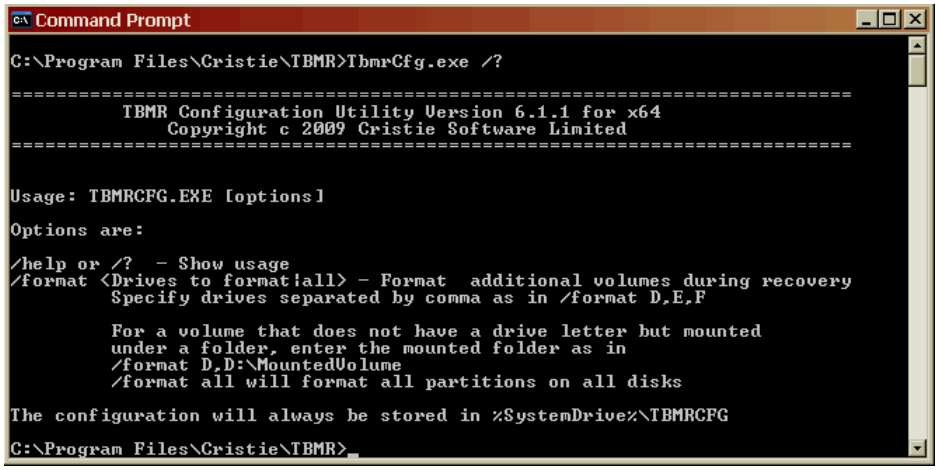
The next sections discuss this process in more detail.

2.1 Creating the Configuration Information

To create the configuration manually run a command window and navigate to the folder where TBMR is installed. For example,



The TBMR configuration program is called TbmrCfg.exe. Enter the command `TbmrCfg.exe /?`. This will display the command line options available.


Command Prompt
C:\Program Files\Cristie\TBMR>TbmrCfg.exe /?
TBMR Configuration Utility Version 6.1.1 for x64
Copyright c 2009 Cristie Software Limited
Usage: TBMRCFG.EXE [options]
Options are:
/help or /? - Show usage
/format <Drives to format|all> - Format additional volumes during recovery
Specify drives separated by comma as in /format D,E,F
For a volume that does not have a drive letter but mounted
under a folder, enter the mounted folder as in
/format D,D:\MountedVolume
/format all will format all partitions on all disks
The configuration will always be stored in %SystemDrive%\TBMRCFG
C:\Program Files\Cristie\TBMR>

The command line options are very simple:

/help or /?

Shows TbmrCfg usage. This displays the command option summary.

/format <Drives to format | all>

The `/format` option allows disk volumes other than the Windows drive to be formatted during the recovery. By default only the Windows volume will be formatted. There is an exception to this if Windows is not contained within the first partition of the disk. In that case both the Boot partition and the Windows partition will be configured for formatting. However, regardless of this setting, the WinPE based recovery environment will allow any or all partitions to be formatted.

So, for example, if volumes D:, E: and F: are to be additionally formatted during recovery, enter:

`TbmrCfg.exe /format D,E,F` (separate the drive letters using a comma)

Enter the following to back up all partitions on all drives on the system:

`TbmrCfg.exe /format all`

Volumes mounted on local folders not having a drive letter can be specified like this:

`TbmrCfg.exe /format D:\MountedVolume`

where `D:\MountedVolume` is the folder mount point. An example using both normal partitions and a mounted volume is:

`TbmrCfg.exe /format D,D:\MountedVolume`

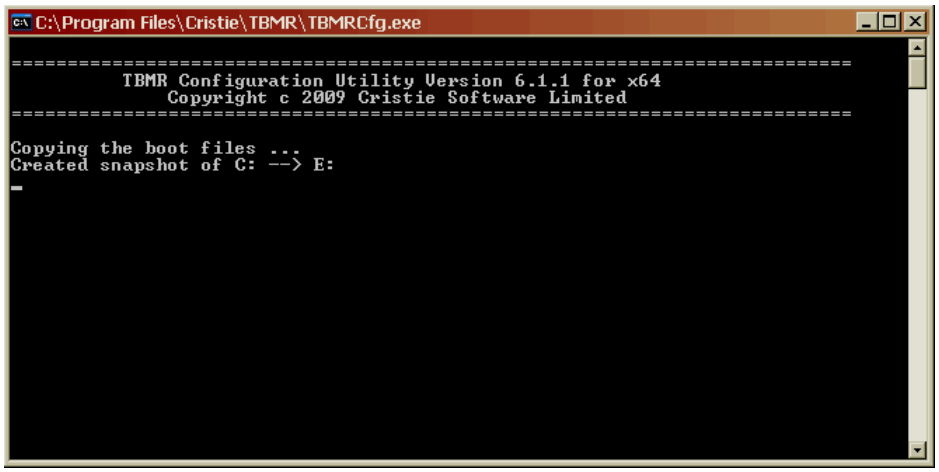
TbmrCfg stores the configuration in `%SystemDrive%\TBMRCFG folder` (`%SystemDrive%` is the drive associated with the Windows folder, usually C:\). This location cannot be changed.

NOTE: It is important to remember that the TBMR configuration must be created before the BA Client backup is made. Cristie suggests that this is done by creating a job to run on the TSM Scheduler containing a script that calls the TbmrCfg.exe program installed in the TBMR installation folder.

2.1.1 64-bit Versions of Windows XP, Vista, 2003 and 2008

On these 64-bit OS's, files additional to the standard TSM backup dataset must be copied and saved. These include boot files which are not normally backed up by the BA Client on these OS's.

Some of the additional files backed up are also locked at the time of backup and must be backed up using the Open File Manager VSS. So when TBMRCfg runs it invokes VSS to take a snapshot copy of these extra files (see below).


C:\Program Files\Cristie\TBMR\TBMRCfg.exe
TBMR Configuration Utility Version 6.1.1 for x64
Copyright c 2009 Cristie Software Limited
Copying the boot files ...
Created snapshot of C: --> E:

3 Using a TSM Backup for Disaster Recovery

TBMR allows a previously created TSM backup to be used as a DR backup.

As long as the TBMR configuration has been created (see previous section) and a TSM backup is performed afterwards, then it will be possible to recover the system using the DR environment.

This document does not describe how to create TSM backups. Please refer to your TSM Administrator's Guide for details.

3.1 Encrypted Backups

TBMR supports encrypted TSM backups. This can be enabled in TSM by adding the line:

```
INCLUDE.ENCRYPT "*:\...\*"
```

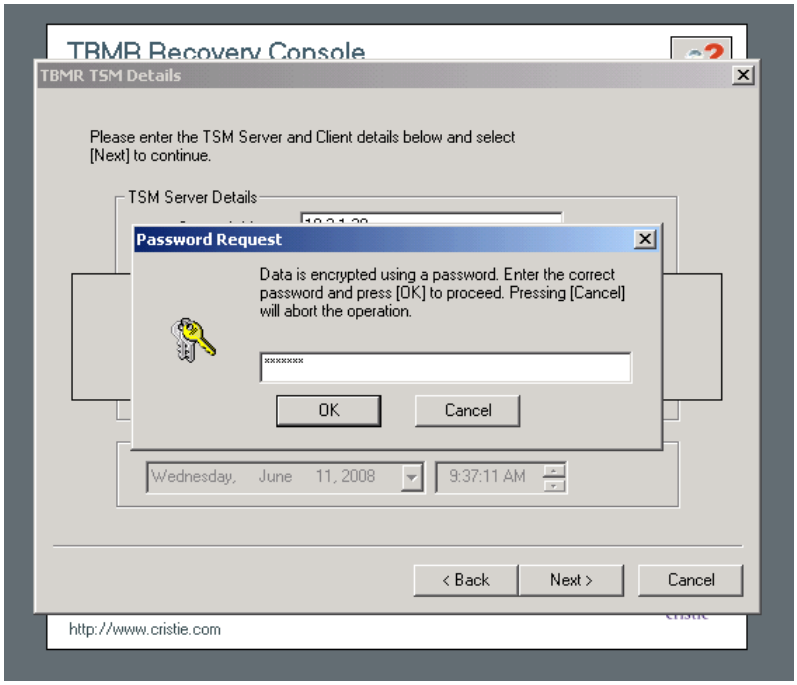
to the dsm.opt file. TBMR works by creating the system configuration into the folder TBMRCFG. So the line above would mean that when the TSM backup is created, the TBMRCFG folder is also encrypted. This is not a problem though, but would mean that you will be prompted for the password during the recovery. If you wish to avoid this prompt add this additional line to dsm.opt `after` the line above:

```
EXCLUDE.ENCRYPT "*:\TBMRCFG\*"
```

You can also choose to always prompt for the encryption key password or have it stored locally. You will be prompted for the encryption key thus:

You should also select the appropriate encryption algorithm for your backup.

If the folder containing the TBMR configuration has been encrypted then during the recovery you will be prompted for the password:


TBMR Recovery Console
TBMR TSM Details
Please enter the TSM Server and Client details below and select [Next] to continue.
TSM Server Details
Password Request
Data is encrypted using a password. Enter the correct password and press [OK] to proceed. Pressing [Cancel] will abort the operation.
OK
Cancel
Wednesday, June 11, 2008
9:37:11 AM
< Back
Next >
Cancel
http://www.cristie.com

If the configuration folder has been excluded from the encryption (as described above) you will be prompted for the password during the '*Restore Files*' phase of the DR.

Please enter the same password you entered during the backup.

Note: If you have elected to have the password stored locally (via the BA Client Preferences menu) and the TBMR configuration has been created post this change, then you will not be prompted for the password during the recovery.

You may also need to perform a 'dummy' backup first to get the password stored locally before generating the TBMR configuration.

---

4 Restoring your System

If the situation arises where you need to recover your system, you have all the necessary information on the DR System CD, the DR Configuration Disk (or file) and the TSM Backup to get your system up and running in minimal time. The restore process requires little user intervention.

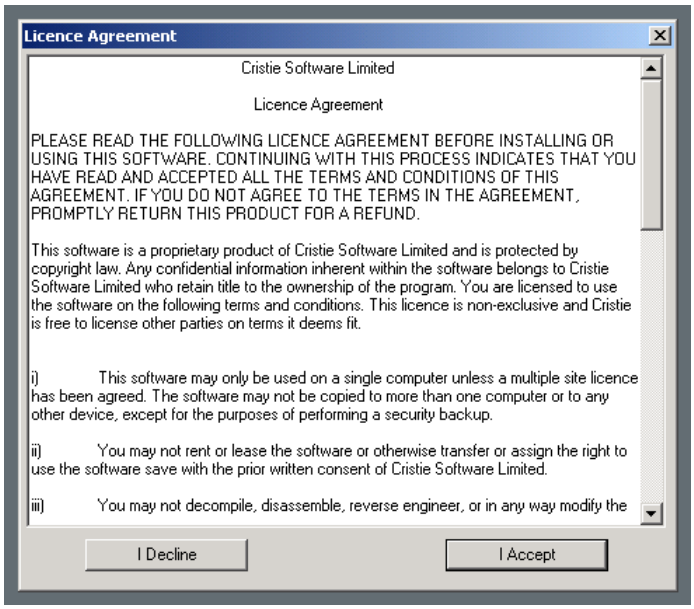
4.1 WinPE Based TBMR Recovery Console

When the WinPE TBMR Console is booted, a Windows installation-like boot procedure is started.

Early on in this process you will be prompted to optionally inject new Mass Storage (disk) drivers if required (this will be useful during dissimilar recovery) by pressing **F6**. Ignore this option if no new drivers are required. This prompt is only displayed for a few seconds.

Finally the WinPE RamDisk image will be loaded from the CD. When the WinPE system has booted it is possible to remove the CD if you wish.

Upon successful boot the following licence Agreement will be displayed.


Licence Agreement
Cristie Software Limited
Licence Agreement
PLEASE READ THE FOLLOWING LICENCE AGREEMENT BEFORE INSTALLING OR USING THIS SOFTWARE. CONTINUING WITH THIS PROCESS INDICATES THAT YOU HAVE READ AND ACCEPTED ALL THE TERMS AND CONDITIONS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS IN THE AGREEMENT, PROMPTLY RETURN THIS PRODUCT FOR A REFUND.
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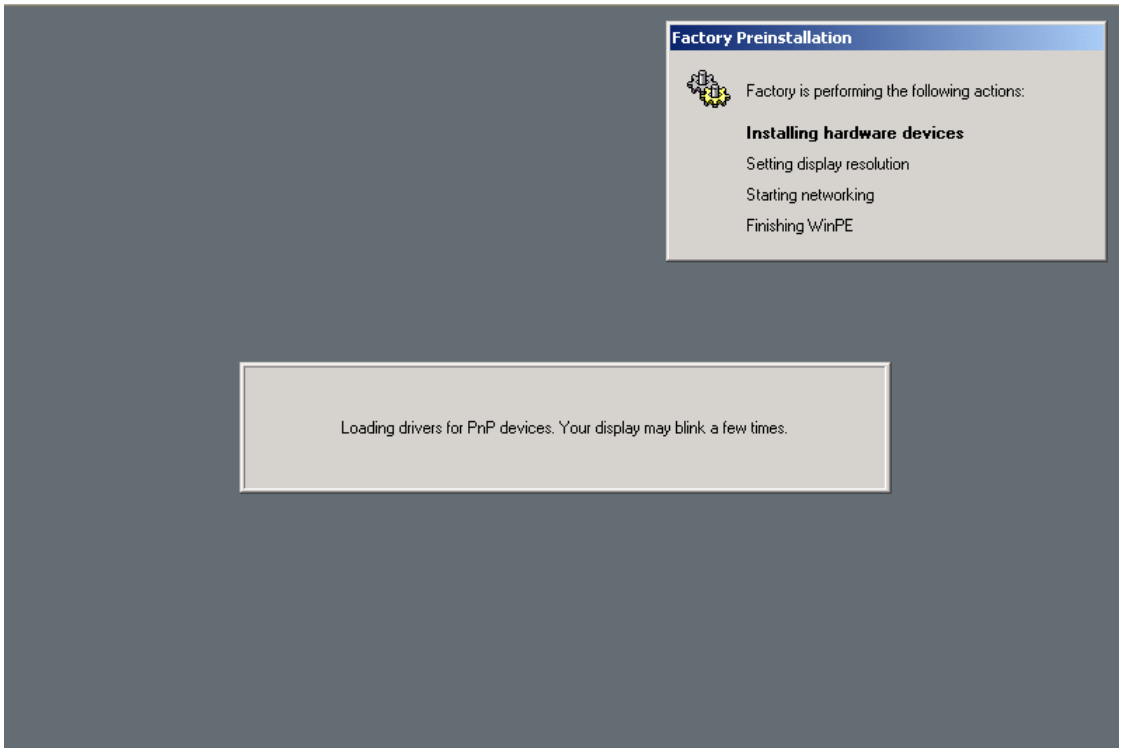
i) This software may only be used on a single computer unless a multiple site licence has been agreed. The software may not be copied to more than one computer or to any other device, except for the purposes of performing a security backup.
ii) You may not rent or lease the software or otherwise transfer or assign the right to use the software save with the prior written consent of Cristie Software Limited.
iii) You may not decompile, disassemble, reverse engineer, or in any way modify the
I Decline
I Accept

Press **I Accept** to continue. Selecting **I Decline** will reboot the system. You must agree to the Licence Terms and Conditions to perform a Disaster Recovery.

Note that the DR Console will automatically reboot 24 hours after starting. This is an operating feature of the Microsoft Windows PE environment.

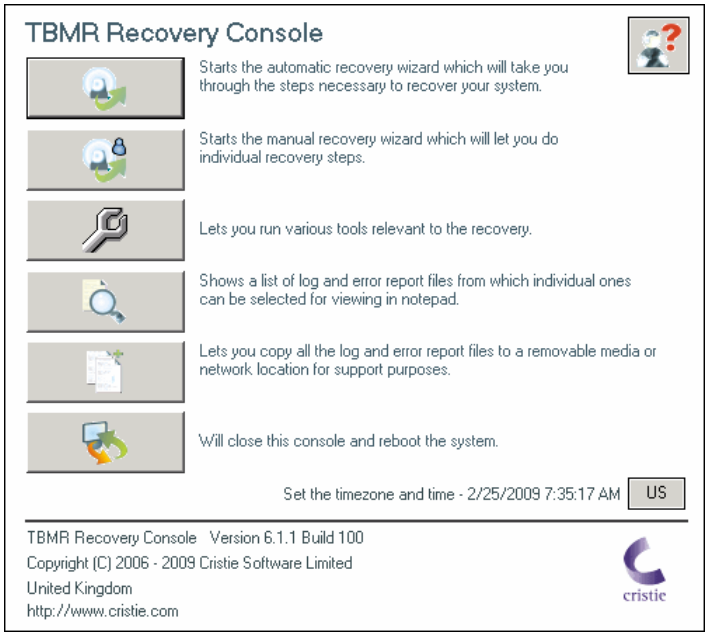
The DR console will then run a Plug and Play sequence to determine the installed devices - in particular the Mass Storage devices and Network Adapters. At this point the screen may blink a few times whilst the Display Adapter is detected.


Factory Preinstallation
Factory is performing the following actions:
Installing hardware devices
Setting display resolution
Starting networking
Finishing WinPE
Loading drivers for PnP devices. Your display may blink a few times.

When this sequence completes the TBMR Recovery Console will be shown.

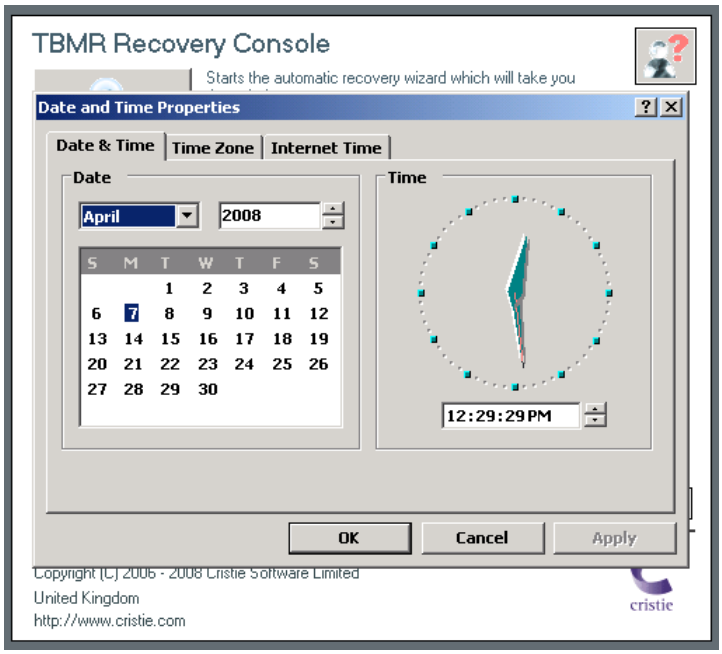
4.1.1 TBMR Recovery Console Main Menu

When you boot the WinPE DR environment, you will see the TBMR Recovery Console Main Menu as below.


TBMR Recovery Console
Starts the automatic recovery wizard which will take you through the steps necessary to recover your system.
Starts the manual recovery wizard which will let you do individual recovery steps.
Lets you run various tools relevant to the recovery.
Shows a list of log and error report files from which individual ones can be selected for viewing in notepad.
Lets you copy all the log and error report files to a removable media or network location for support purposes.
Will close this console and reboot the system.
Set the timezone and time - 2/25/2009 7:35:17 AM
US
TBMR Recovery Console Version 6.1.1 Build 100
Copyright (C) 2006 - 2009 Cristie Software Limited
United Kingdom
http://www.cristie.com
cristie

You may configure the displayed date/time and the keyboard layout, by pressing the US icon.

By default the standard display uses US layout, but this may be changed to one of the listed alternatives. Select Date, Time and Time Zone to configure the locale.



4.1.2 Booting the DR Console from CD-ROM

Insert the bootable DR CD-ROM and reset the machine. You will be initially prompted to:

```
Press any key to boot from CD.......
```

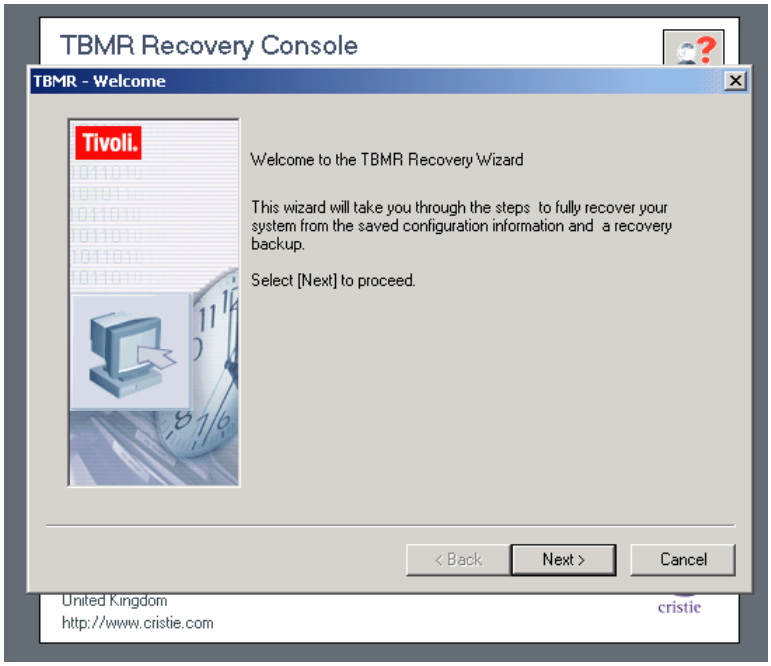
This prompt is only made for a few seconds before the system will attempt to boot the underlying OS, so you will need to react quickly!

Early on in this process you will be prompted to optionally inject new Mass Storage (disk) drivers if required (this will be useful during dissimilar recovery) by pressing F6. Ignore this option if no new drivers are required. Again, this prompt is only displayed for a few seconds.

Finally the WinPE RamDisk image will be loaded from the CD. When the WinPE system has booted it is possible to remove the CD if you wish.

4.1.3 Start Automatic Recovery Wizard

Select this option to commence a automatic DR sequence.


TBMR Recovery Console
TBMR - Welcome
Tivoli.
Welcome to the TBMR Recovery Wizard
This wizard will take you through the steps to fully recover your system from the saved configuration information and a recovery backup.
Select [Next] to proceed.
< Back
Next >
Cancel
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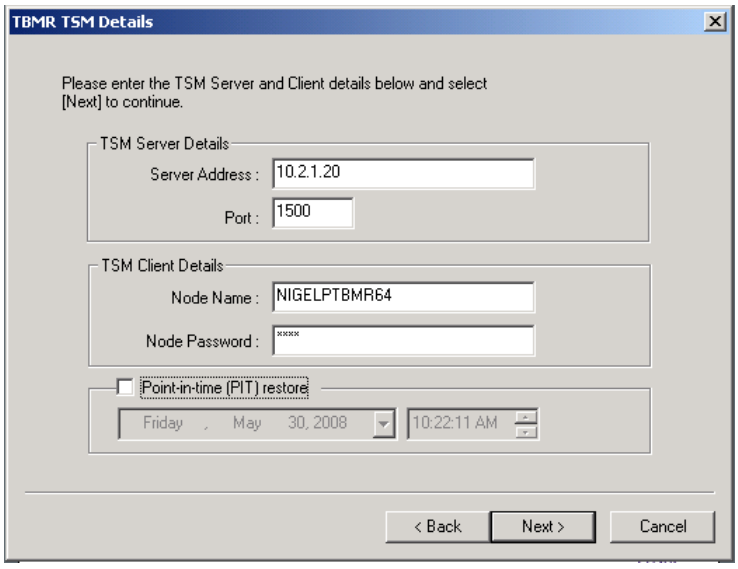
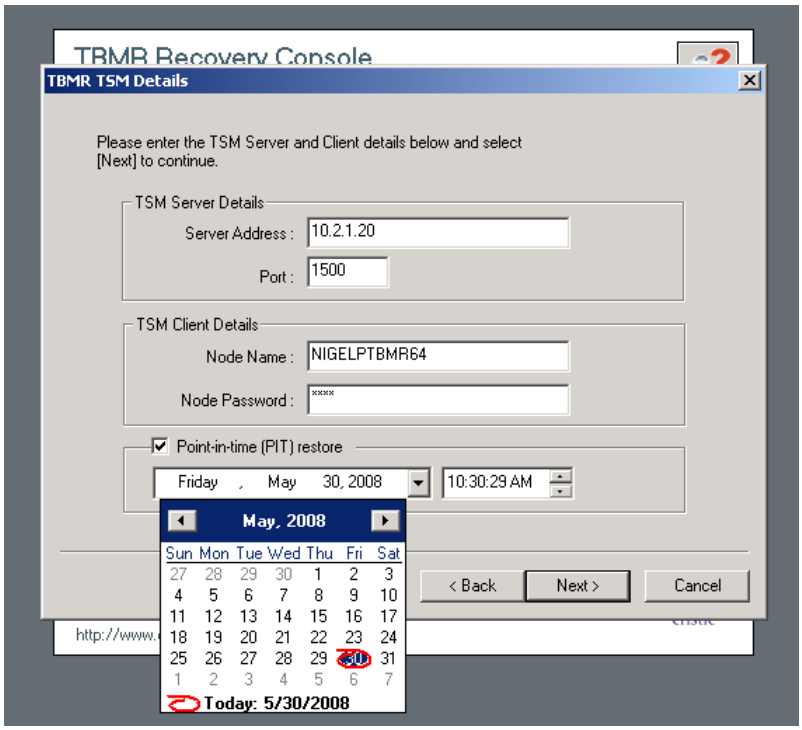
Press **Next>** to proceed to the first step of the sequence. Press **Cancel** to abort the recovery sequence at this point or **Help** to display context sensitive help.

Specify TSM Details and Recovery Date/Time

The first step of the automatic recovery identifies the location of the TSM Server and Node used to back up the Client.



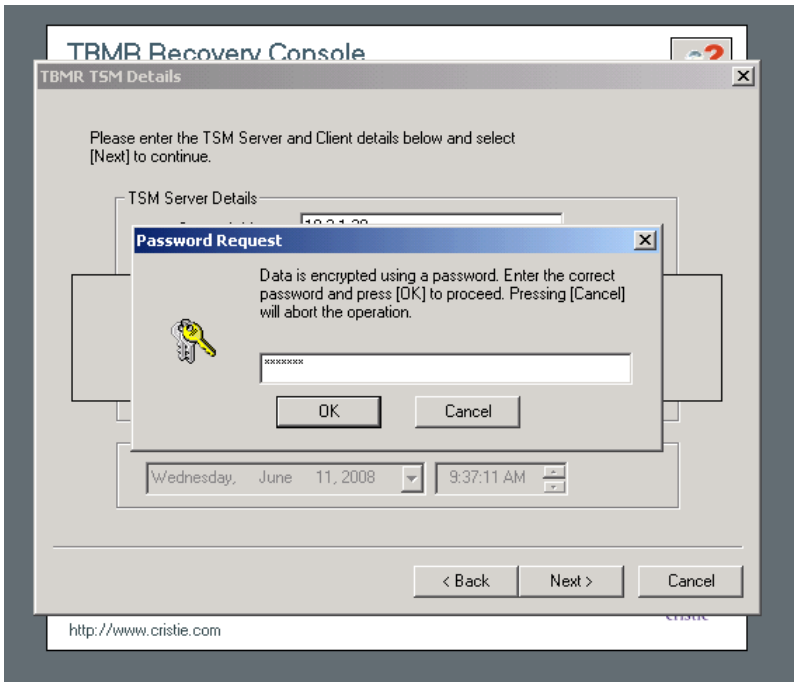
Selecting the Point-in-time (PIT) restore mode will allow the system to be recovered to a point closest to the specified date/time. The version of any files restored are closest to but not younger than the specified date/time. If required to restore from an older date, selecting the down-arrow in the day/month field brings up a calendar.



This can be used to scroll the months/years backwards and forwards as necessary. Note, a future date will result in the latest backup being recovered.

If PIT mode is not selected then, by default, the latest file versions will be restored.Then select **Next>** to continue.

If the backup including the TBMR configuration folder TBMRCFG is encrypted, a prompt for the encryption password will be displayed if not held locally:


TBMR Recovery Console
TBMR TSM Details
Please enter the TSM Server and Client details below and select [Next] to continue.
TSM Server Details
Password Request
Data is encrypted using a password. Enter the correct password and press [OK] to proceed. Pressing [Cancel] will abort the operation.
****
OK
Cancel
Wednesday, June 11, 2008
9:37:11 AM
< Back
Next >
Cancel
http://www.cristie.com

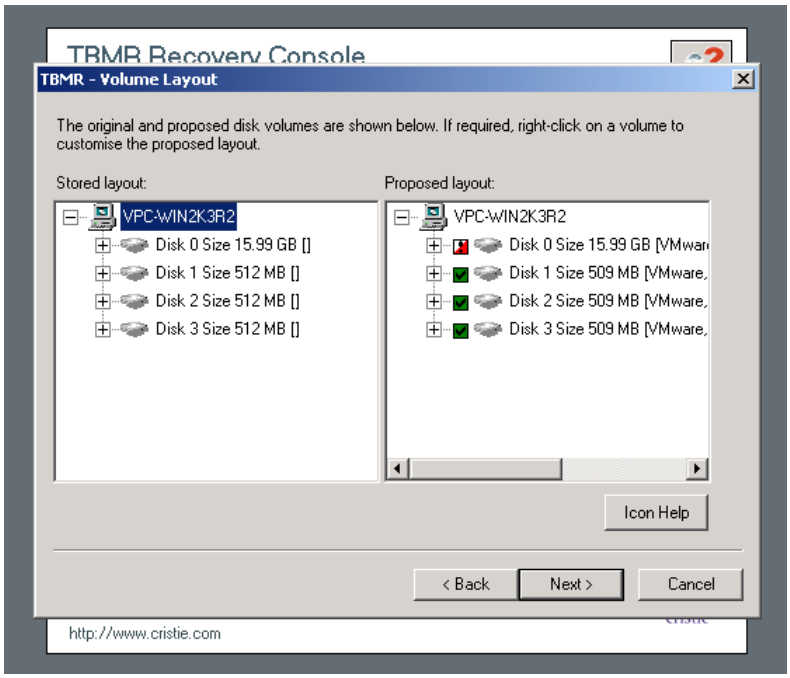
Enter the password used during the backup.

Note: TBMR assumes that TCP/IP is the communication method used between the Client and the Server. Other TSM communication methods are not currently supported.

Press **OK>** to proceed.

Confirm Volume Layout

The next step in the automatic recovery shows a list of the disks and partitions to be recovered.


TBMR Recovery Console
TBMR - Volume Layout
The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.
Stored layout:
Proposed layout:
VPC-WIN2K3R2
Disk 0 Size 15.99 GB []
Disk 1 Size 512 MB []
Disk 2 Size 512 MB []
Disk 3 Size 512 MB []
VPC-WIN2K3R2
Disk 0 Size 15.99 GB [VMwar
Disk 1 Size 509 MB [VMware,
Disk 2 Size 509 MB [VMware,
Disk 3 Size 509 MB [VMware,
Icon Help
< Back
Next >
Cancel
http://www.cristie.com

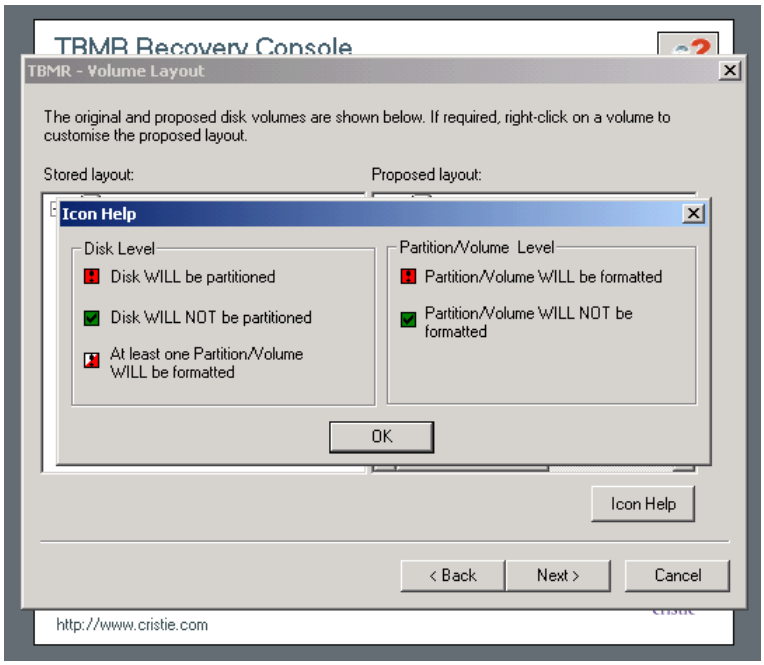
The left-hand panel of the display shows the original disk layout and partitions. The right-hand panel shows how the recovered disks will be partitioned after the recovery.

A green tick box next to a disk signifies that the disk and its underlying partitions will be left intact. Placed next to a partition/volume means that the corresponding partition/volume WILL NOT be partitioned.

A red exclamation mark placed next to a disk means it WILL be partitioned during recovery. Placed next to a partition or volume means that the corresponding partition/volume WILL be partitioned.

A red/white exclamation mark placed next to a disk means at least one partition/volume WILL be partitioned.

Click on the **Icon Help** button to display a summary of this:

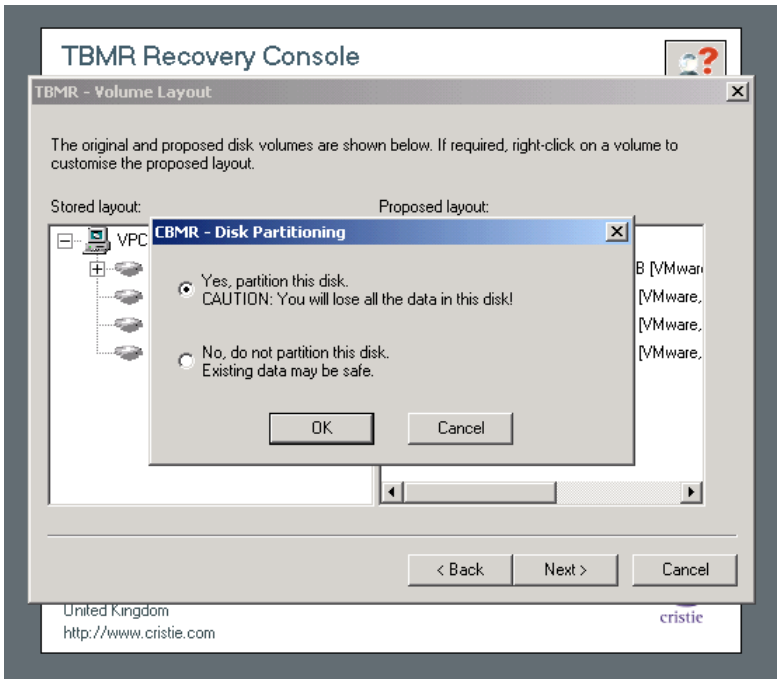


When the recovery is to the original system the contents of both panels will look similar if the number of disks is the same. Possibly the disk sizes will be different (as in the above example).

When performing a recovery to a dissimilar system the disk mapping can be much more complex. Some of the criteria used to judge the disk mapping match are:

- disk geometry (tracks, cylinders and sectors)
- disk capacity
- if currently formatted, the disk signature

You may right-click on any disk shown in the right-hand panel to select whether the disk will be formatted or not.


TBMR Recovery Console
TBMR - Volume Layout
The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.
Stored layout:
Proposed layout:
CBMR - Disk Partitioning
Yes, partition this disk.
CAUTION: You will lose all the data in this disk!
No, do not partition this disk.
Existing data may be safe.
OK
Cancel
< Back
Next >
Cancel
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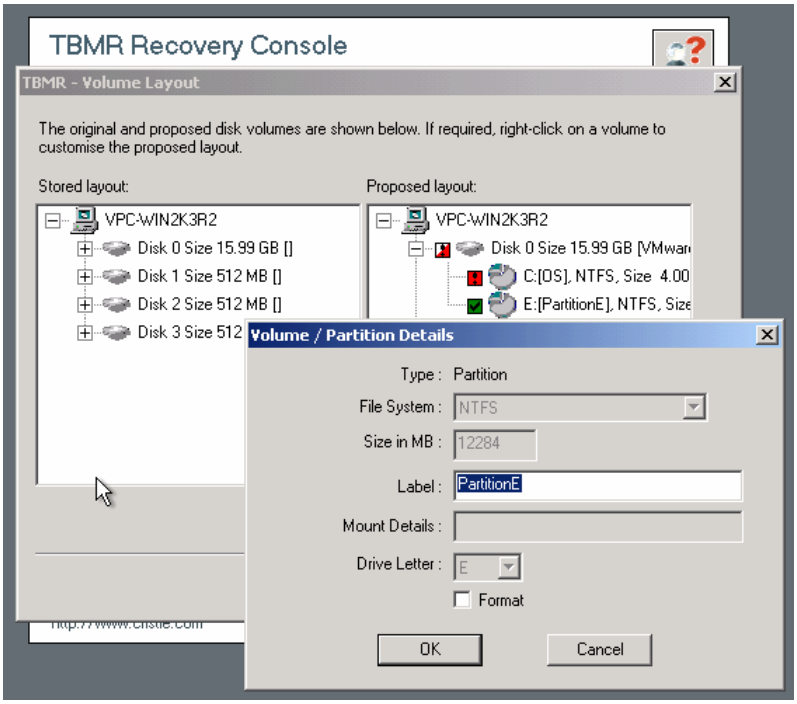
Any attempt to turn off formatting incorrectly will result in this error.

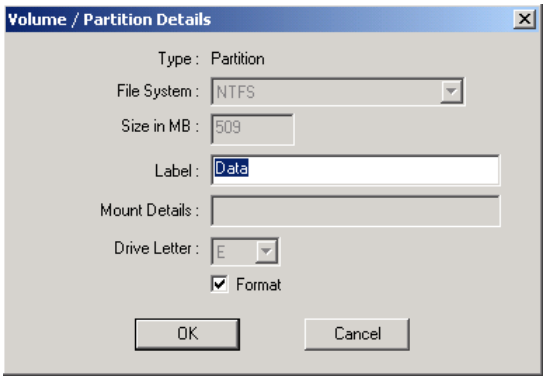
You may also right-click on a partition to allow you to selectively modify the partition parameters or to remove it altogether.


TBMR Recovery Console
TBMR - Volume Layout
The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.
Stored layout:
Proposed layout:
VPC-WIN2K3R2
Disk 0 Size 15.99 GB []
Disk 1 Size 512 MB []
Disk 2 Size 512 MB []
Disk 3 Size 512
VPC-WIN2K3R2
Disk 0 Size 15.99 GB [VMwar
C:[OS], NTFS, Size 4.00
E:[PartitionE], NTFS, Size
Volume / Partition Details
Type : Partition
File System : NTFS
Size in MB : 12284
Label : PartitionE
Mount Details :
Drive Letter : E
Format
OK
Cancel

You may **Modify** the following partition parameters:

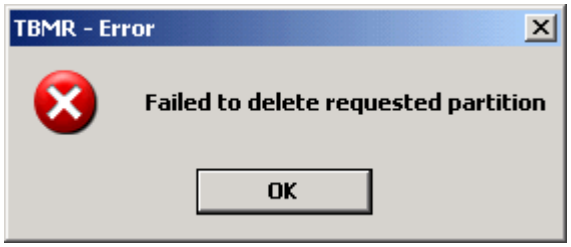
- size in MB (only if disk is shown with a)
- label
- format (yes/no)

The screenshot below shows this.



Select **Delete** to remove the partition completely (only if disk is shown with a).

If you attempt to either not format or delete a Windows system partition, an error such as this will be displayed.



At this stage nothing has happened to the disks. Press **Next>** to continue with the recovery.

Proceed With The Recovery

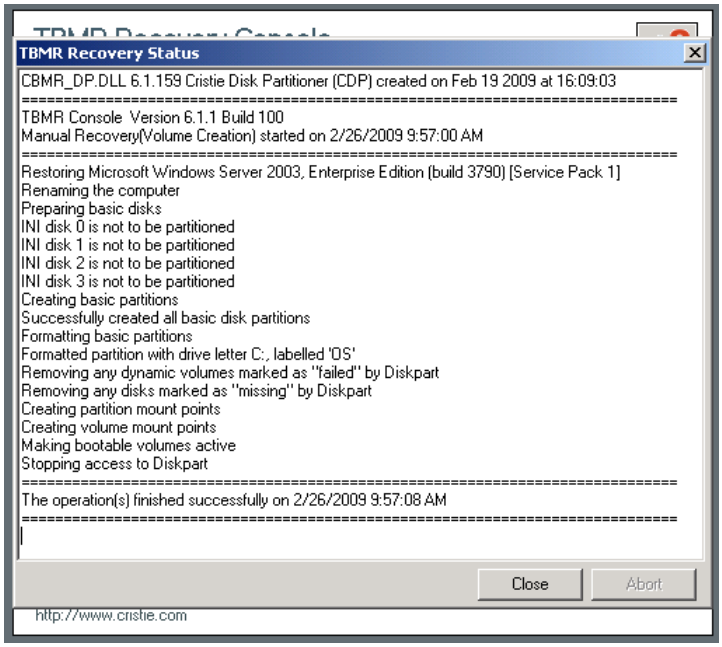
Before continuing with the actual recovery a final warning screen is displayed.

If you are happy with the recovery configuration, press **Finish**. This will commence the actual recovery.

Note: This procedure will completely destroy any existing data on disks selected for format (i.e shown with a). Disks or partitions tagged as *no format* (i.e. shown with a) will however be retained.

Disk Recovery Sequence

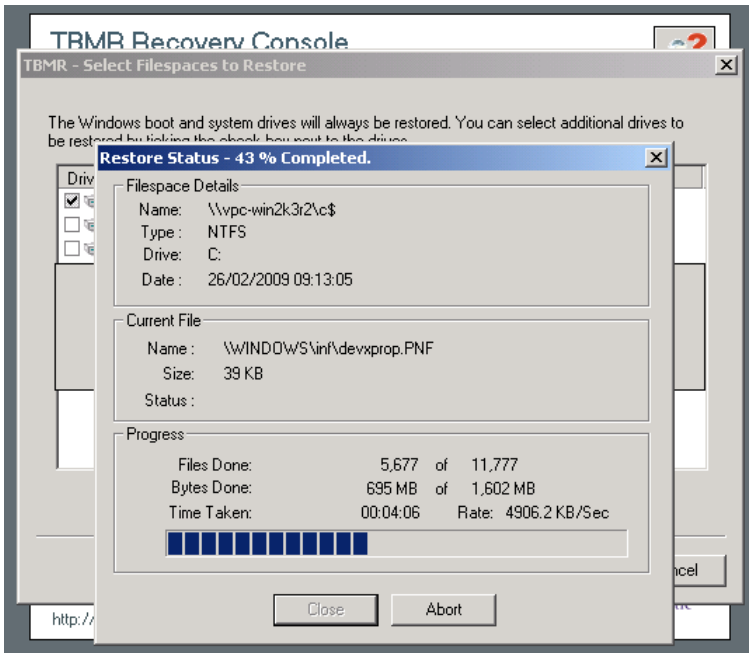
The recovery sequence begins by preparing the disks selected for the recovery.


TBMR Recovery Status
CBMR_DP.DLL 6.1.159 Cristie Disk Partitioner (CDP) created on Feb 19 2009 at 16:09:03
TBMR Console Version 6.1.1 Build 100
Manual Recovery(Volume Creation) started on 2/26/2009 9:57:00 AM
Restoring Microsoft Windows Server 2003, Enterprise Edition (build 3790) [Service Pack 1]
Renaming the computer
Preparing basic disks
INI disk 0 is not to be partitioned
INI disk 1 is not to be partitioned
INI disk 2 is not to be partitioned
INI disk 3 is not to be partitioned
Creating basic partitions
Successfully created all basic disk partitions
Formatting basic partitions
Formatted partition with drive letter C:, labelled 'OS'
Removing any dynamic volumes marked as "failed" by Diskpart
Removing any disks marked as "missing" by Diskpart
Creating partition mount points
Creating volume mount points
Making bootable volumes active
Stopping access to Diskpart
The operation(s) finished successfully on 2/26/2009 9:57:08 AM
Close
Abort
http://www.cristie.com

This involves:

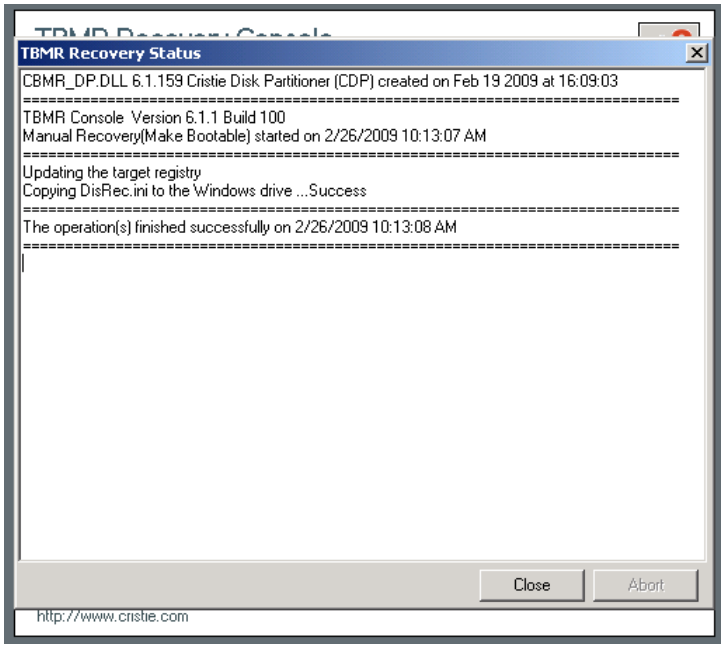
- disk mapping original layout to new
- cleaning (removing any existing disk partitions)
- removing any existing dynamic volume databases
- re-creating the partitions
- converting to dynamic volumes if required
- formating to the required partition type.

The next step is to recover the backups to the selected target disks/partitions. A new window appears containing the restore status of recovered files and a progress bar which indicates how much of the backup has been restored.. This display also shows the recovery statistics in terms of time, size and throughput.



This process may take some minutes if the backups are large. You may select the **Abort** button to terminate the file recovery process, but this may leave the disk or partition in an unpredictable state which may be unusable.

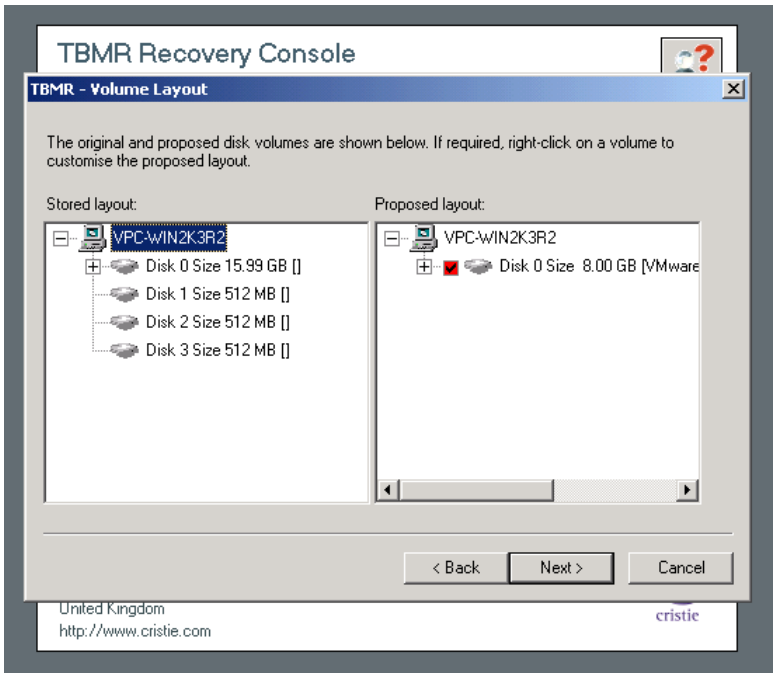
If any errors occur during the recovery, an error message will be shown in the window. Refer to the logs post recovery to establish the cause of any error.


TBMR Recovery Status
CBMR_DP.DLL 6.1.159 Cristie Disk Partitioner (CDP) created on Feb 19 2009 at 16:09:03
TBMR Console Version 6.1.1 Build 100
Manual Recovery(Make Bootable) started on 2/26/2009 10:13:07 AM
Updating the target registry
Copying DisRec.ini to the Windows drive ...Success
The operation(s) finished successfully on 2/26/2009 10:13:08 AM
Close
Abort
http://www.cristie.com

Press **Close** to return to the Recovery Console main menu. At this point you may want to view the recovery logs and perhaps copy the logs to a local device or remote share before selecting to reboot. Note that recovery logs are also saved to the recovered system to the TBMR installation sub-folder '*Temp*' (e.g. "C:\Program Files\Cristie\TBMR\Temp").

Disk Scaling

In situations where the target system has fewer or smaller disks than the original system, disk scaling will come into effect. For example,


TBMR Recovery Console
TBMR - Volume Layout
The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.
Stored layout:
Proposed layout:
VPC-WIN2K3R2
Disk 0 Size 15.99 GB []
Disk 1 Size 512 MB []
Disk 2 Size 512 MB []
Disk 3 Size 512 MB []
VPC-WIN2K3R2
Disk 0 Size 8.00 GB [VMware
< Back
Next >
Cancel
United Kingdom
http://www.cristie.com
cristie

The above example shows a recovery from an original system with 4 physical disks to a target system with only 1 disk. The target disk is also much smaller than the original disks.

In this case TBMR will select as many disks to recover as possible (in this case only 1 disk - the boot disk). In addition it will scale the partitions down in proportion to their original size and occupancy. This can be complicated by having say mirrored dynamic volumes when the mirror will need to be broken - if only 1 disk exists on the target (or it has been tagged as not to modify).

Note 1: The Volume Layout dialog will only show disks in the left hand panel that can be recovered.

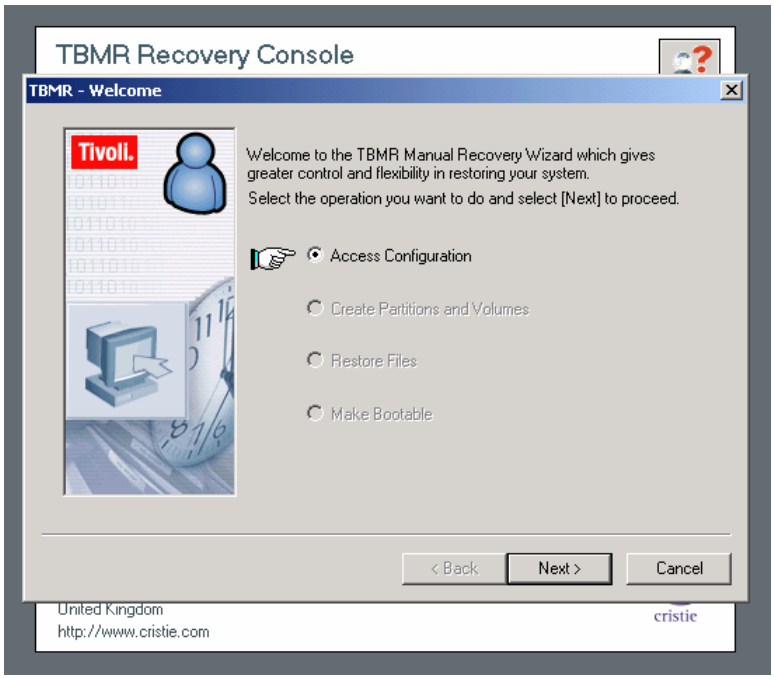
Note 2: During a recovery to a system with larger disks the partition sizes will remain the same as the original by default. However, in this case, it is possible to increase partition size manually during the recovery by right-clicking on the partition icon and selecting Modify.

4.1.4 Start Manual Recovery Sequence

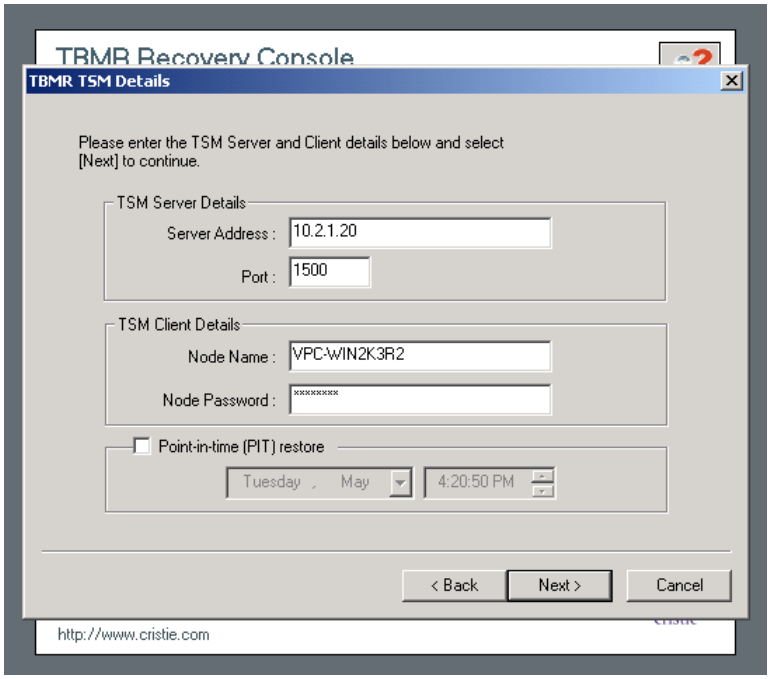
Select this option to commence a manual DR sequence. This option will stop after each step in the DR sequence allowing the DR to be aborted or the step to be repeated with different parameters.

Locate Configuration

The first step of the manual DR sequence is to provide the location of the DR configuration.

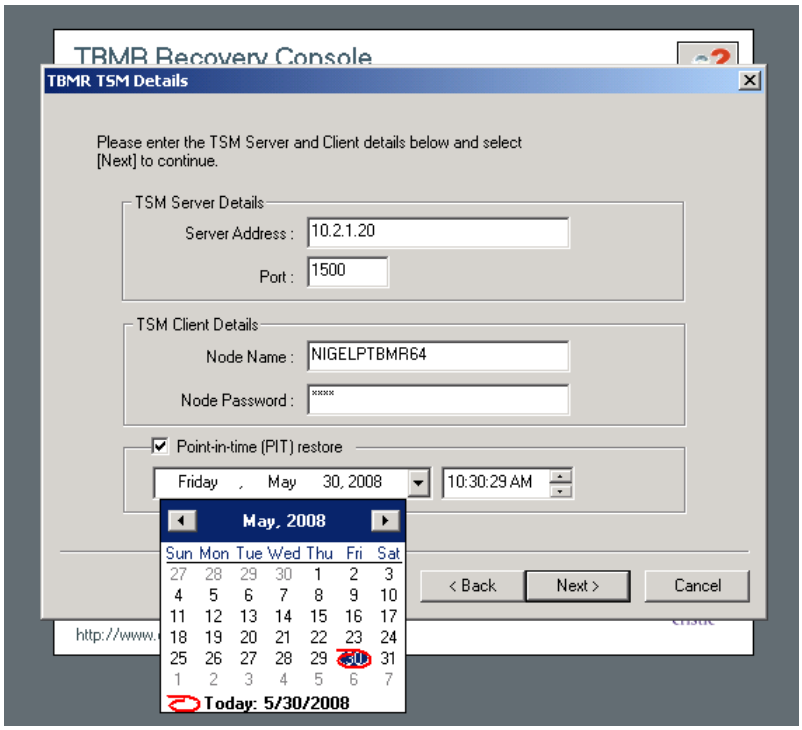


Press **Next>** to continue to:



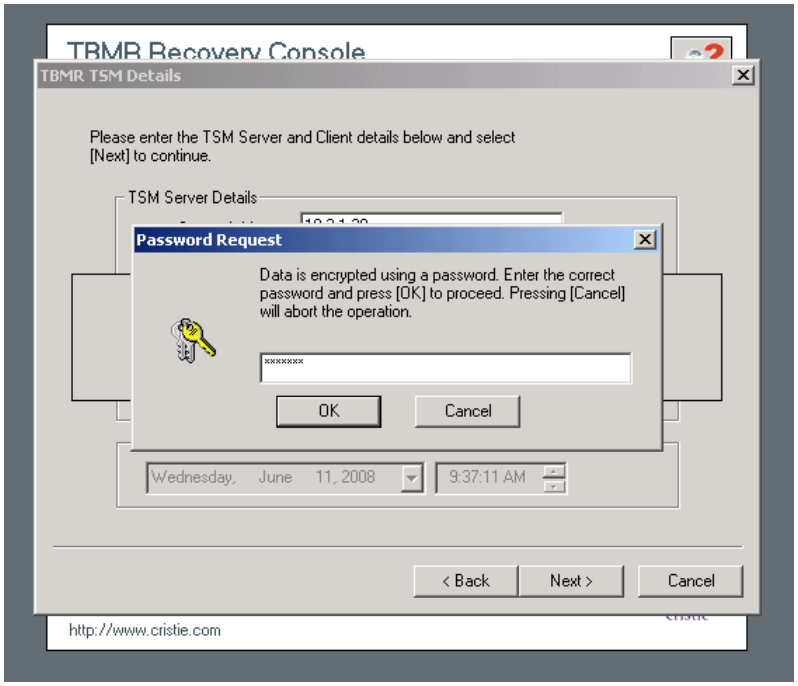
Specify the location of the TSM Server and Node used to back up the Client.

Selecting the Point-in-time (PIT) restore mode will allow the system to be recovered to a point closest to the specified date/time. The version of any files restored are closest to but not younger than the specified date/time. If required date is not the current WinPE date, selecting the down-arrow in the day/month field brings up a calendar.



This can be used to scroll the months/years backwards and forwards as necessary. Note, a future date will result in the latest backup being recovered.

Then select **Next>** to continue. If the backup including the TBMR configuration folder CBMRCFG is encrypted, a prompt for the encryption password will be displayed if not held locally:


TBMR Recovery Console
TBMR TSM Details
Please enter the TSM Server and Client details below and select [Next] to continue.
TSM Server Details
Password Request
Data is encrypted using a password. Enter the correct password and press [OK] to proceed. Pressing [Cancel] will abort the operation.
****
OK
Cancel
Wednesday, June 11, 2008
9:37:11 AM
< Back
Next >
Cancel
http://www.cristie.com

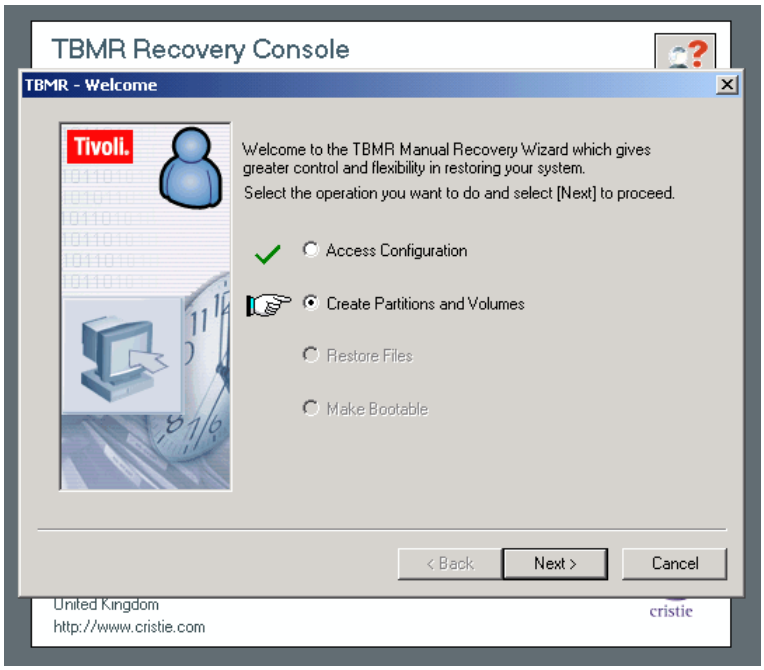
Enter the password used during the backup and press **OK>**.

Successful extraction of the configuration from the server is confirmed with the following dialog:

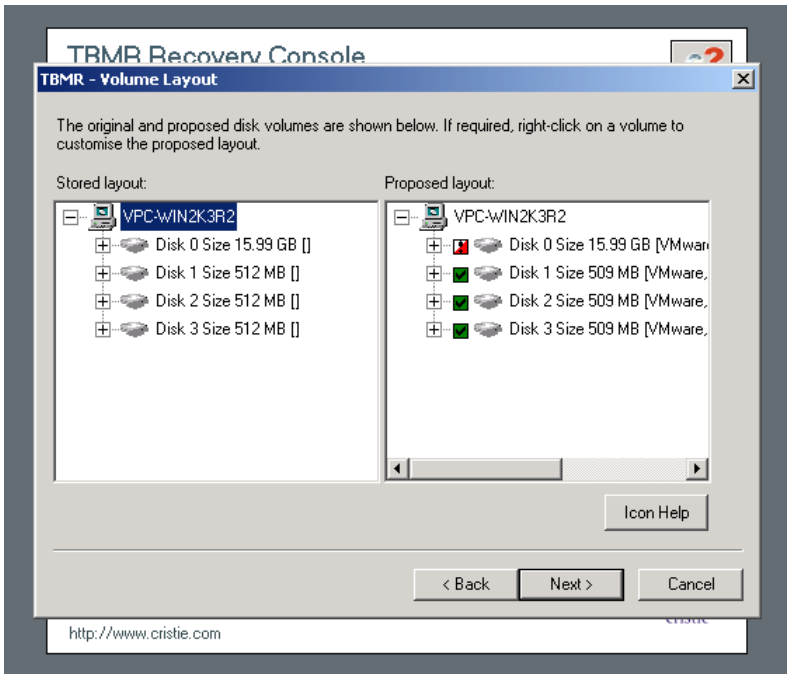
Select **Finish** and control returns to the next step in the Manual Recovery sequence.

Create Partition and Volumes

The next step of the manual recovery process is to configure the target disk partitions and volumes.



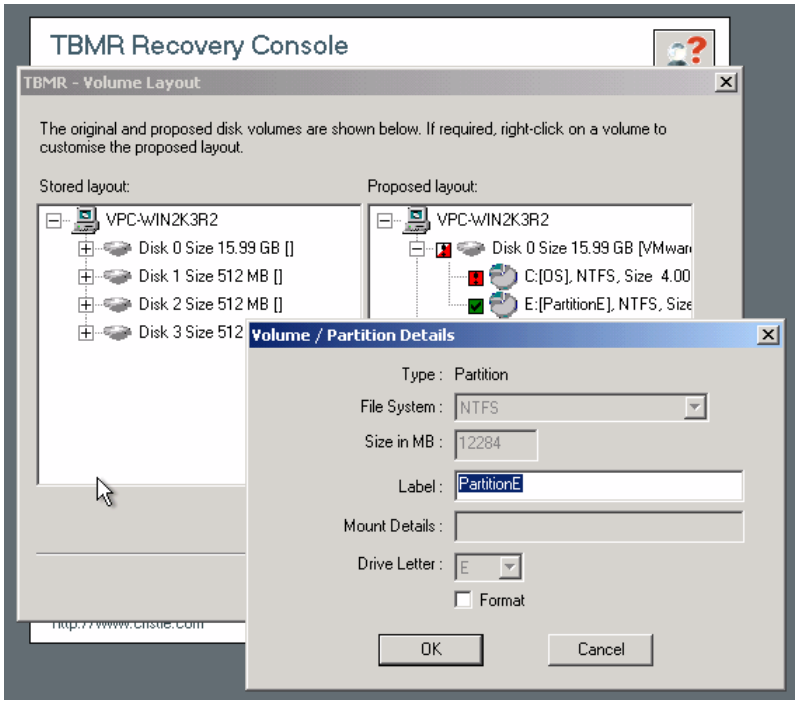
Select **Next>** to display the Volume Layout dialog.

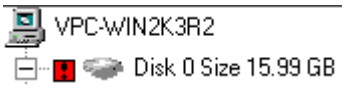

TBMR Recovery Console
TBMR - Volume Layout
The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.
Stored layout:
Proposed layout:
VPC-WIN2K3R2
Disk 0 Size 15.99 GB []
Disk 1 Size 512 MB []
Disk 2 Size 512 MB []
Disk 3 Size 512 MB []
VPC-WIN2K3R2
Disk 0 Size 15.99 GB [VMwar
Disk 1 Size 509 MB [VMware,
Disk 2 Size 509 MB [VMware,
Disk 3 Size 509 MB [VMware,
Icon Help
< Back
Next >
Cancel
http://www.cristie.com

This screen shows the original disk layout against that of the target system. Naturally the target disk layout could be very different to the original. TBMR will attempt to match the disks using its own in-built criteria. Some of the criteria used to judge the match are:

- disk geometry (tracks, cylinders and sectors)
- disk capacity
- if currently formatted, the disk signature

However, it is possible to change the partition size or opt to tag/untag whether or not a partition should be formatted. To do this right click on the the disk icon and the following configuration dialog is displayed.


TBMR Recovery Console
TBMR - Volume Layout
The original and proposed disk volumes are shown below. If required, right-click on a volume to customise the proposed layout.
Stored layout:
Proposed layout:
VPC-WIN2K3R2
Disk 0 Size 15.99 GB []
Disk 1 Size 512 MB []
Disk 2 Size 512 MB []
Disk 3 Size 512
VPC-WIN2K3R2
Disk 0 Size 15.99 GB [VMwar
C:[OS], NTFS, Size 4.00
E:[PartitionE], NTFS, Size
Volume / Partition Details
Type : Partition
File System : NTFS
Size in MB : 12284
Label : PartitionE
Mount Details :
Drive Letter : E
Format
OK
Cancel



The indicator shown next to the disk icon indicates whether that disk will be left intact or not. A red exclamation mark indicates that the disk will be re-partitioned and/or formatted. A green tick indicates that the disk will be left intact.

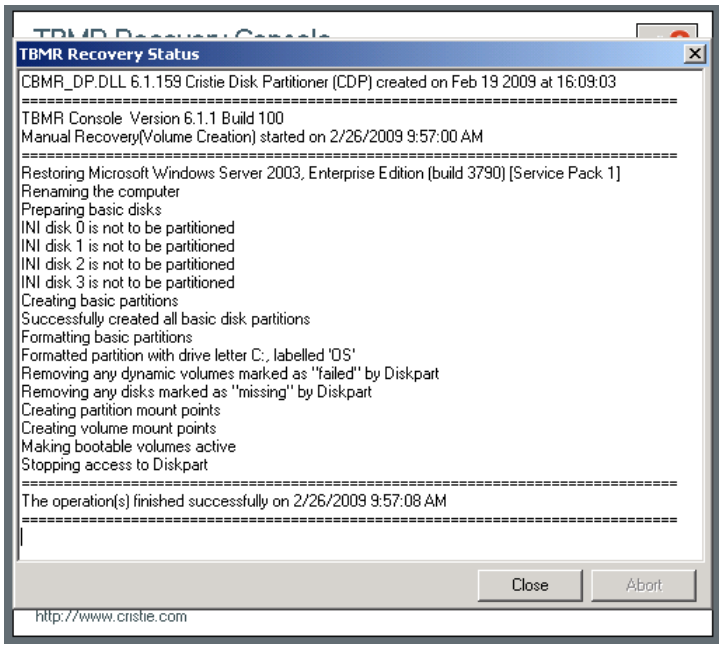
Disks and partitions are discussed in more detail in the Automatic Recovery - Recovery Details section.

Press **<Back** to return to the previous step, **Finish** to commence the active part of this step or **Cancel** to abort.

If you are happy with the recovery configuration, press **Finish**. This will commence the actual recovery.

Note: This procedure will completely destroy any existing data on the disks selected for recovery. Disks or partitions tagged as *no format* will however be retained.

The **Create Partitions and Volumes** step begins by preparing the disk selected for the recovery.


TBMR Recovery Status
CBMR_DP.DLL 6.1.159 Cristie Disk Partitioner (CDP) created on Feb 19 2009 at 16:09:03
TBMR Console Version 6.1.1 Build 100
Manual Recovery(Volume Creation) started on 2/26/2009 9:57:00 AM
Restoring Microsoft Windows Server 2003, Enterprise Edition (build 3790) [Service Pack 1]
Renaming the computer
Preparing basic disks
INI disk 0 is not to be partitioned
INI disk 1 is not to be partitioned
INI disk 2 is not to be partitioned
INI disk 3 is not to be partitioned
Creating basic partitions
Successfully created all basic disk partitions
Formatting basic partitions
Formatted partition with drive letter C:, labelled 'OS'
Removing any dynamic volumes marked as "failed" by Diskpart
Removing any disks marked as "missing" by Diskpart
Creating partition mount points
Creating volume mount points
Making bootable volumes active
Stopping access to Diskpart
The operation(s) finished successfully on 2/26/2009 9:57:08 AM
Close
Abort
http://www.cristie.com

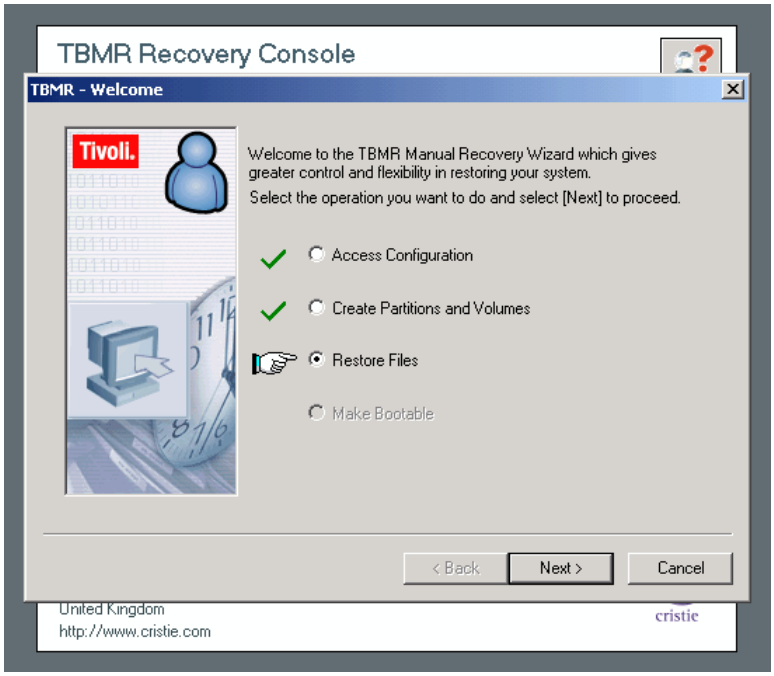
This involves:

- disk mapping original layout to new
- cleaning (removing any existing disk partitions)
- removing any existing dynamic volume databases
- re-creating the partitions
- converting to dynamic volumes if required
- formating to the required partition type.

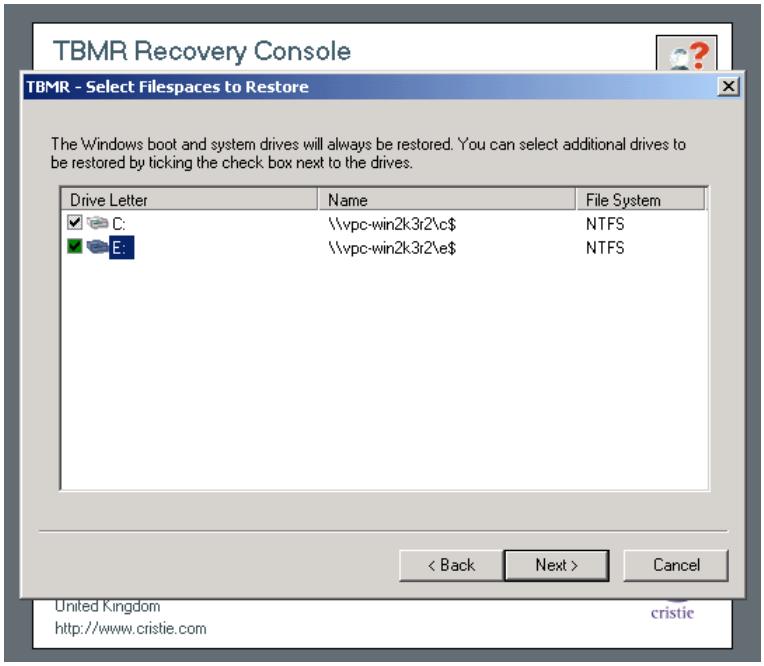
Press **Next>** to continue with the recovery.

Restore Files

The next step of the manual recovery process is to restore the DR backup files.

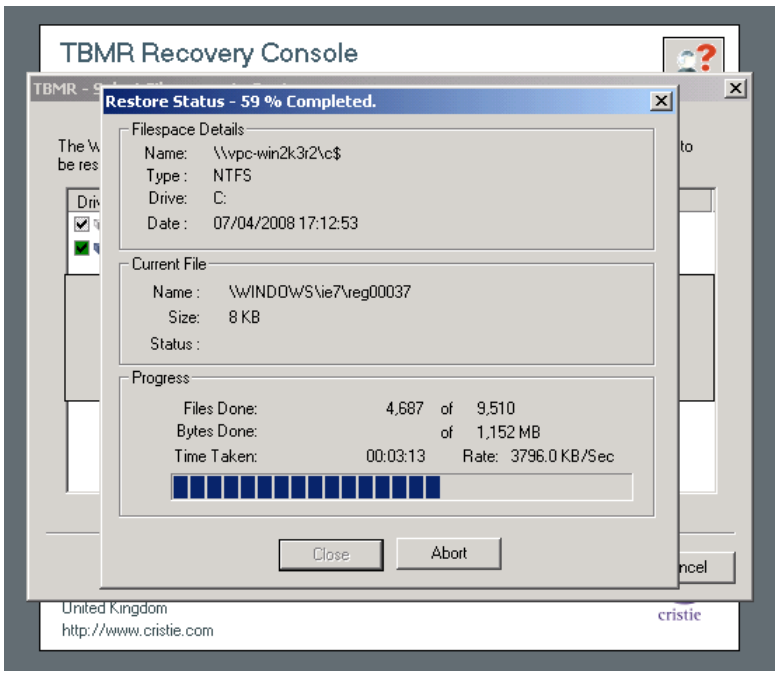


Press Next> to identify the TSM filespaces that should be recovered. Note that the *SystemState filespace* will always be recovered by default.



Press **Next>** to commence the restore of the TSM filespaces to their target disks/partitions.

Finally, a new window appears containing the restore status of recovered files and a progress bar which indicates how much of the backup has been restored.. This display also shows the recovery statistics in terms of time, size and throughput.



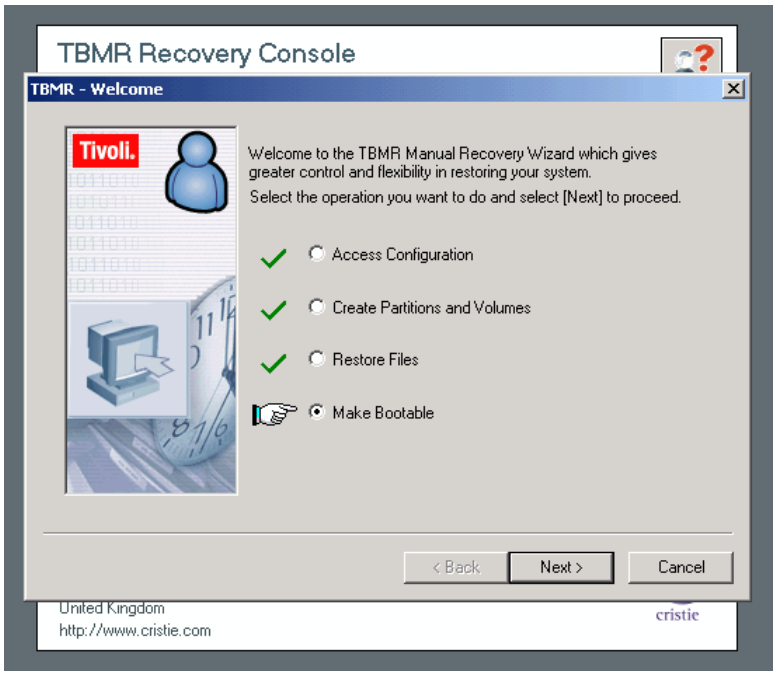
This process may take some minutes if the backups are large. You may select the **Abort** button to terminate the file recovery process, but this may leave the disk or partition in an unpredictable state which may be unusable.

If any errors occur during the recovery, an error message will be shown in the window. Refer to the logs post recovery to establish the cause of any error. When the restore files step completes the following dialog is displayed.

Select **Finish** and control returns to the next step in the Manual Recovery sequence.

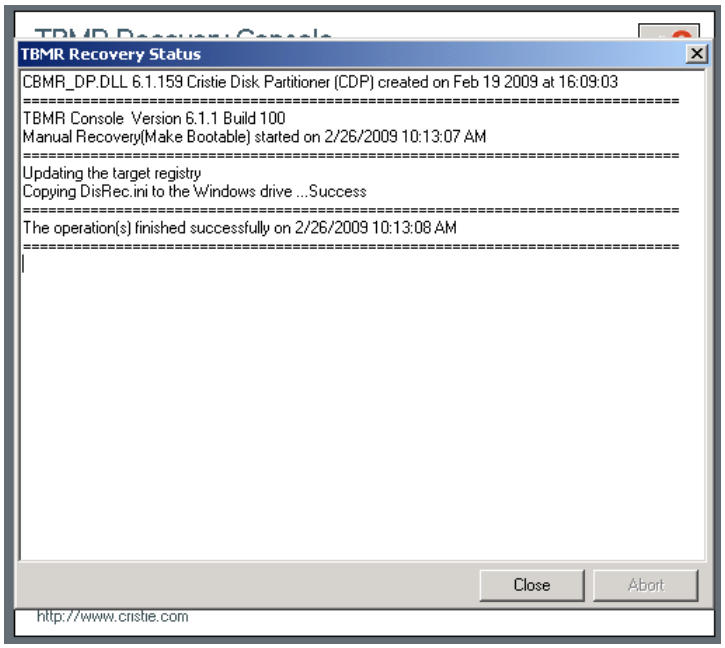
Make Bootable

The final step in the manual recovery sequence is to make the original disk 'bootable'. This involves re-creating the MBR of the boot disk and modifying the registry with the new disk GUID.



Press **Next>** to commence the make bootable step..

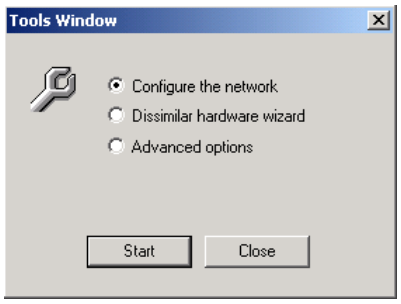
A new dialog window opens summarising the success or failure of the operation..


TBMR Recovery Status
CBMR_DP.DLL 6.1.159 Cristie Disk Partitioner (CDP) created on Feb 19 2009 at 16:09:03
TBMR Console Version 6.1.1 Build 100
Manual Recovery(Make Bootable) started on 2/26/2009 10:13:07 AM
Updating the target registry
Copying DisRec.ini to the Windows drive ...Success
The operation(s) finished successfully on 2/26/2009 10:13:08 AM
Close
Abort
http://www.cristie.com

Press **Close** to complete the step and return to the Manual Recovery Wizard.

4.1.5 Tools

There are a few tools that can assist with the recovery process. They are all collected under this command button.



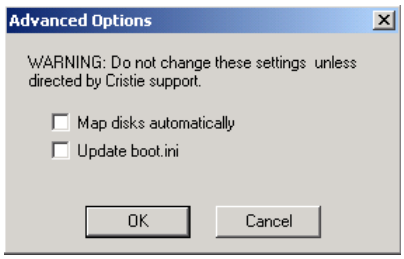
The options available are:

- Configure the network
- Dissimilar Hardware Wizard
- Advanced options

Selecting **Configure the network** will start the Cristie Network Configurator tool. This provides extensive facilities to configure network during the DR process.

The **Dissimilar Hardware Wizard** will allow drivers to be injected into the recovered system when the target hardware has different devices from the original (e.g. RAID controllers).

Advanced options should only be selected when advised to do so by Cristie Support staff.



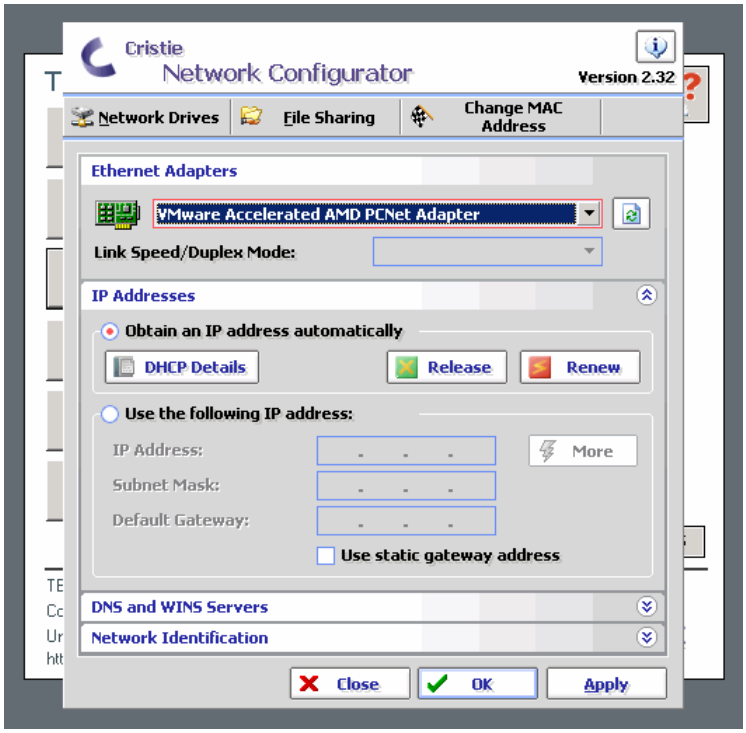
Cristie Network Configurator Tool

This is a very powerful tool that provides extensive facilities to configure the network during the recovery process. It offers the following features:

- supports multiple NICs
- configure individual NIC parameters for duplex mode and link speed
- the ability to select DHCP allocated or static IP addresses
- the ability to setup DNS and WINS server IP addresses
- the ability to setup the Network Identification of the recovering system.
- allow file shares to be set on the recovering system.
- map/unmap network drives.

Configure NIC Parameters

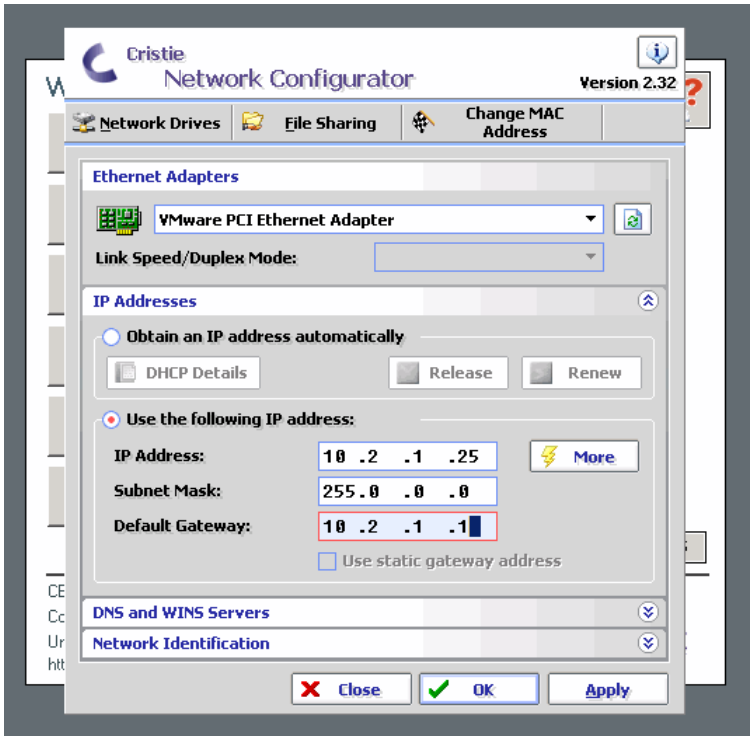
It is possible to change both the link speed and duplex mode for any NIC detected on the recovering target system. Simply choose the NIC from the drop down box and select the desired mode. *Autosense* is the default.



Assign Static or DHCP IP Settings

Normally the WinPE DR environment will start with DHCP enabled and active. However, if a static IP is required use the Use the following IP Addresses option to manually configure.

First choose the network adapter from the drop down list where a static IP address is to be applied.



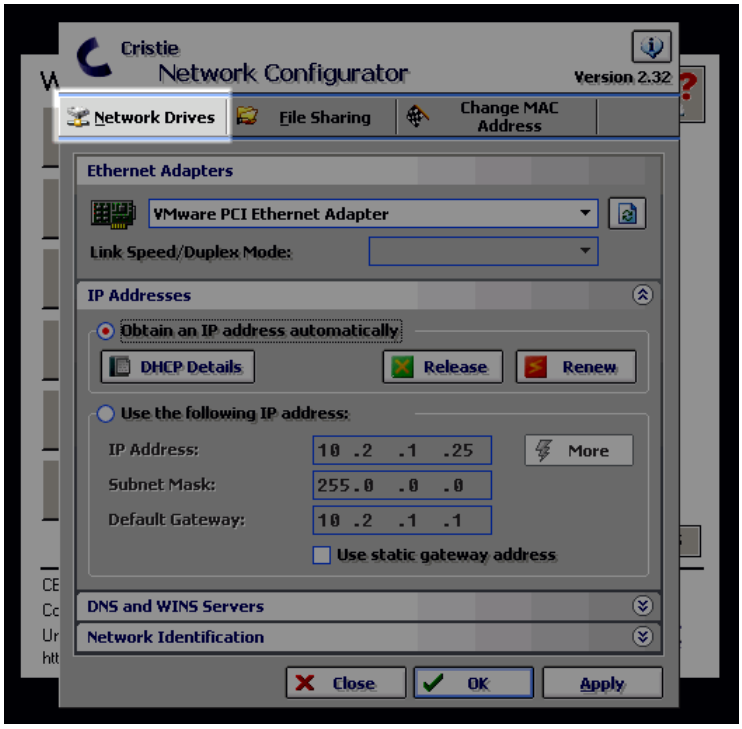
Select Use the following IP Addresses radio button and set the IP address, subnet mask and gateway IP address. The **More** button will allow the system to have more than one static IP addresses.

Click on **Apply** to confirm the settings for the selected adapter.

This feature will also allow the DHCP lease to be released or renewed, as required.

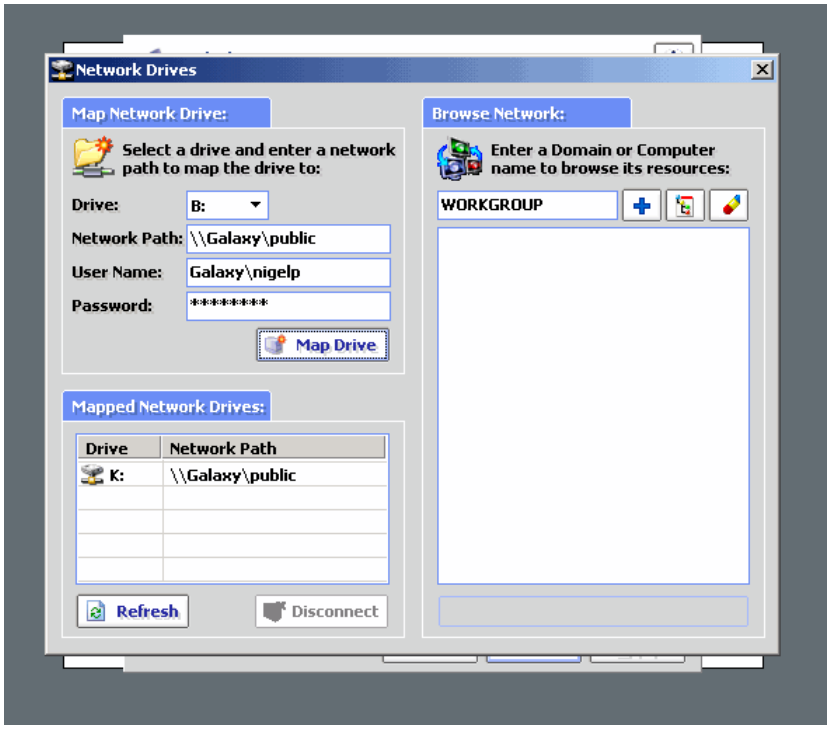
Map a Network Drive

In order to simplify access to network resources, the Network Configurator allows you to map a network drive to a network share.



Start the Network Configurator from the Tools menu and select the **Network Drives** button.

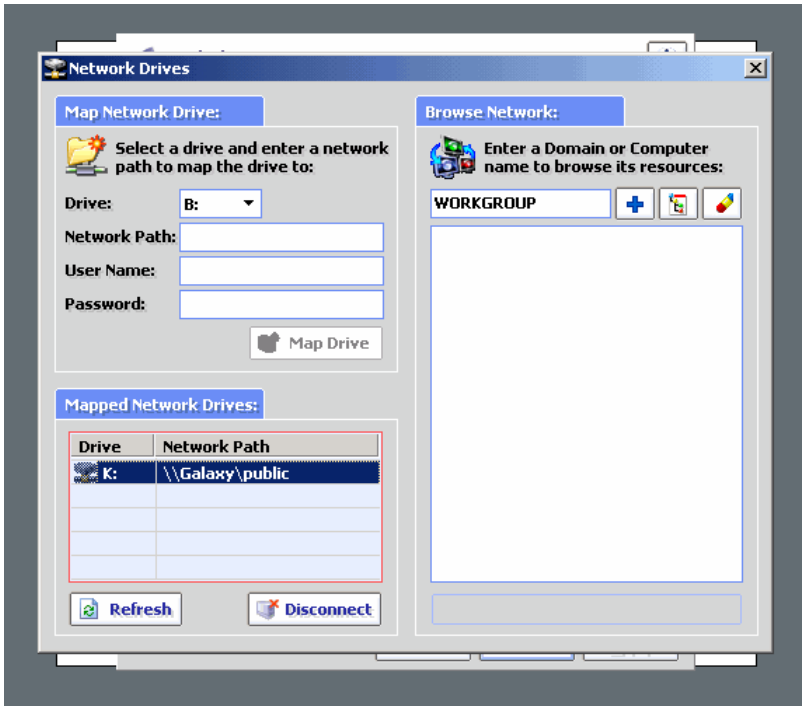
Select the drive letter that you wish to allocate from the **Drive** drop-down box and type in the share name that you wish to associate with it. Also specify the network credentials to be used to access the share. Press **Map Drive** to confirm the share operation. If successful the share will be added to the Mapped Network Drives table (see below).



Press the icon on the top right of the dialog window to return to the Network Configurator main menu.

Disconnect Network Drives

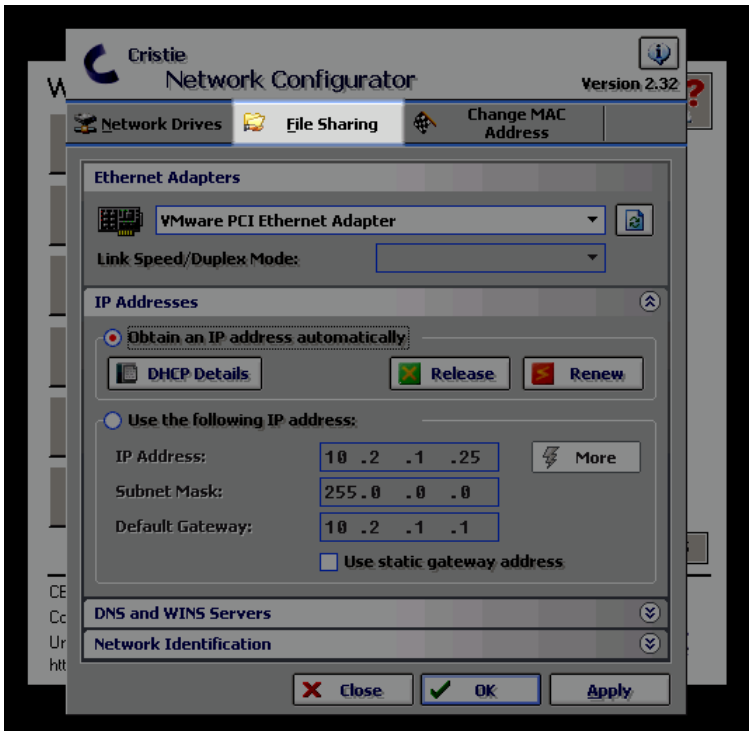
If you need to disconnect a mapped drive for any reason, this option allows you to do this.



Just highlight the drive that you wish to disconnect from the Mapped Network Drives list and then click **Disconnect**. The mapped drive is removed from the list to confirm the operation.

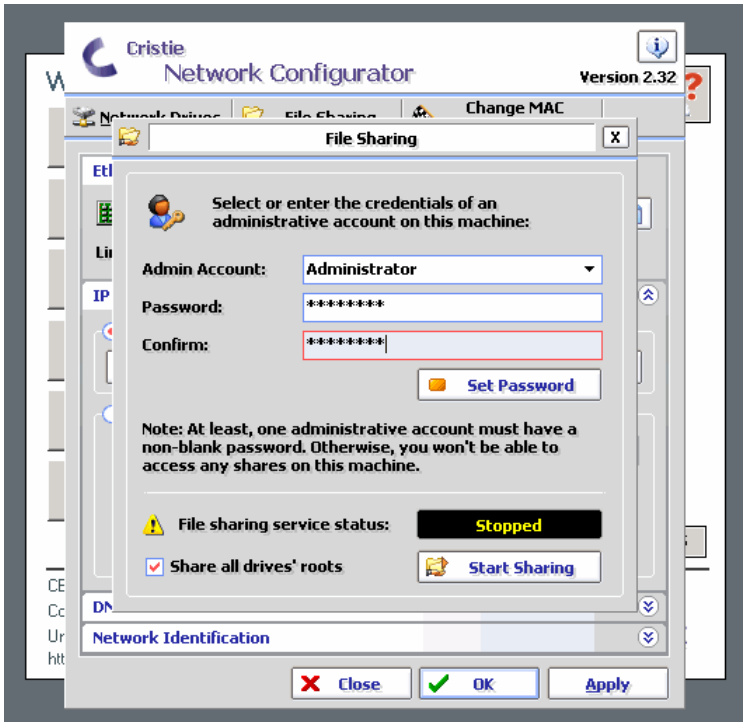
Local File Sharing

It is possible to allow local drives to be shared on the network using the File Sharing feature of the Network Configurator.

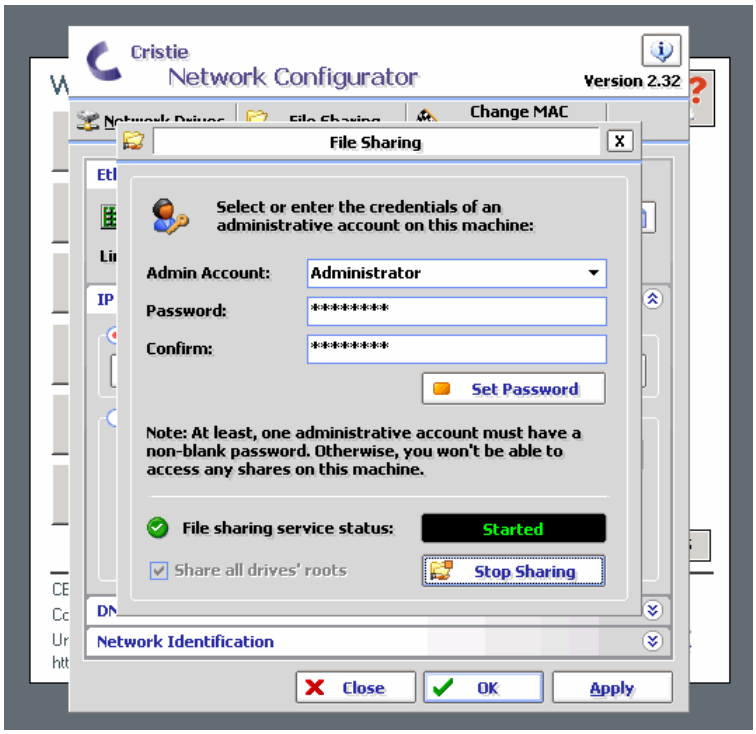


This gives you remote read/write access to any of the drives in the WinPE environment (including any of the recovered drives).

A two step process is required to enable this feature. First you must setup some remote access credentials. If users elsewhere on the network have these credentials then they may access the configured drives. Make sure you specify a non-blank password.



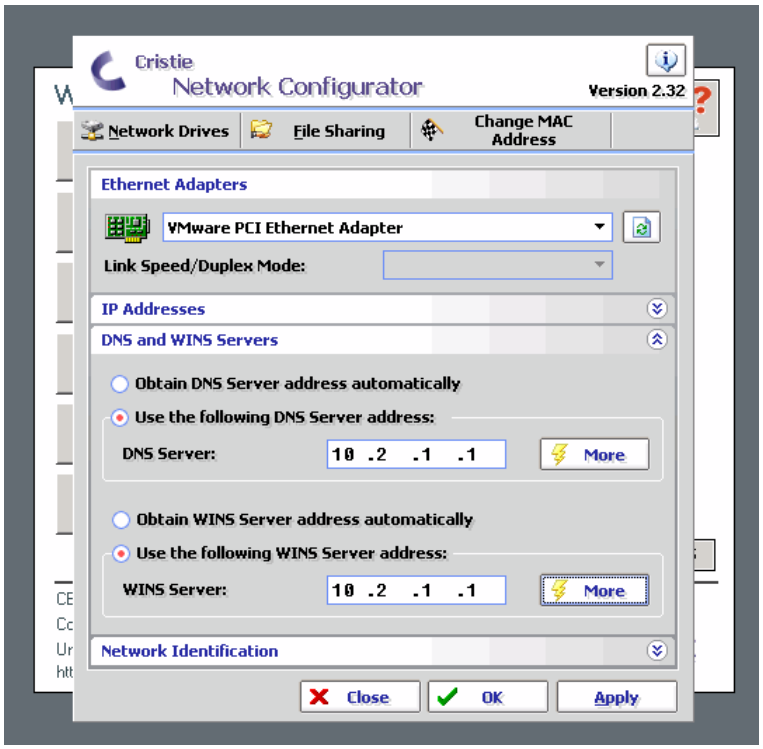
Next start the file sharing service by clicking the **Start Sharing** button.



Click on the icon to exit this dialog and return to the main **Network Configurator** menu.

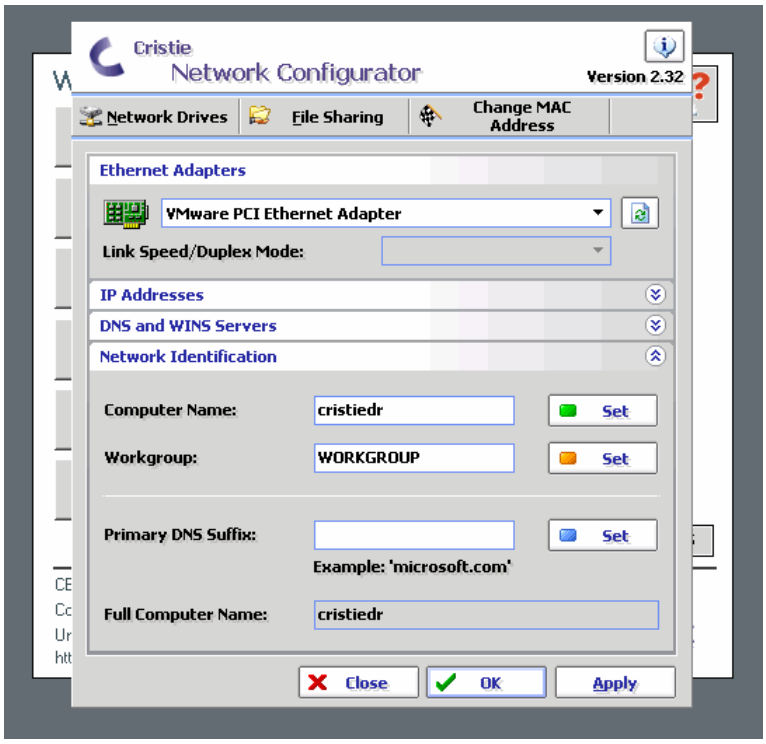
Setup DNS And WINS Servers

Using this option allows DNS and WINS server IP addresses to be set for the WinPE environment.



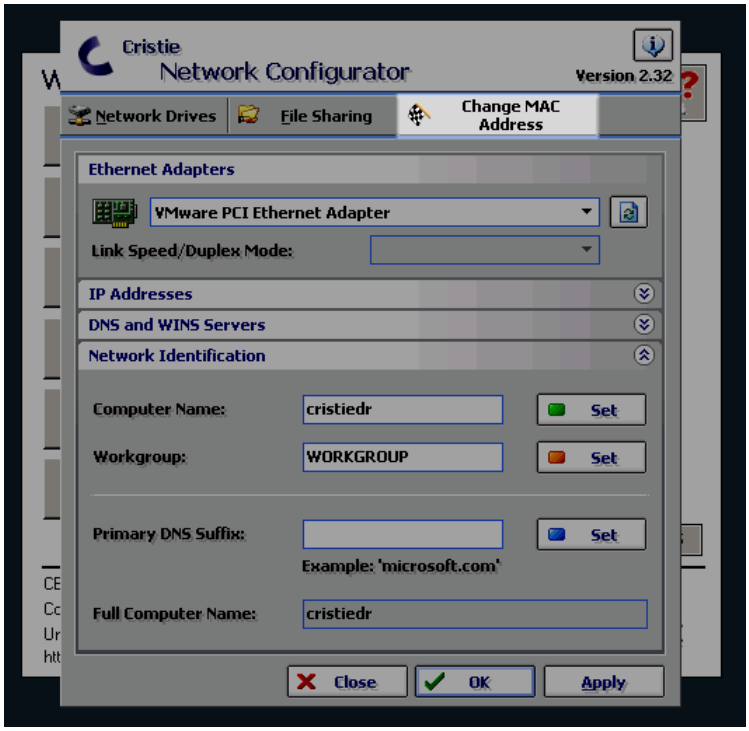
Setup Network Identification

It is possible to setup the Network Identification of the recovering system. This allows the WinPE hostname and workgroup to be changed during a DR session. These details are transient and only apply while the WinPE DR session is running. They are not applied to the recovering system when it reboots after the DR session.

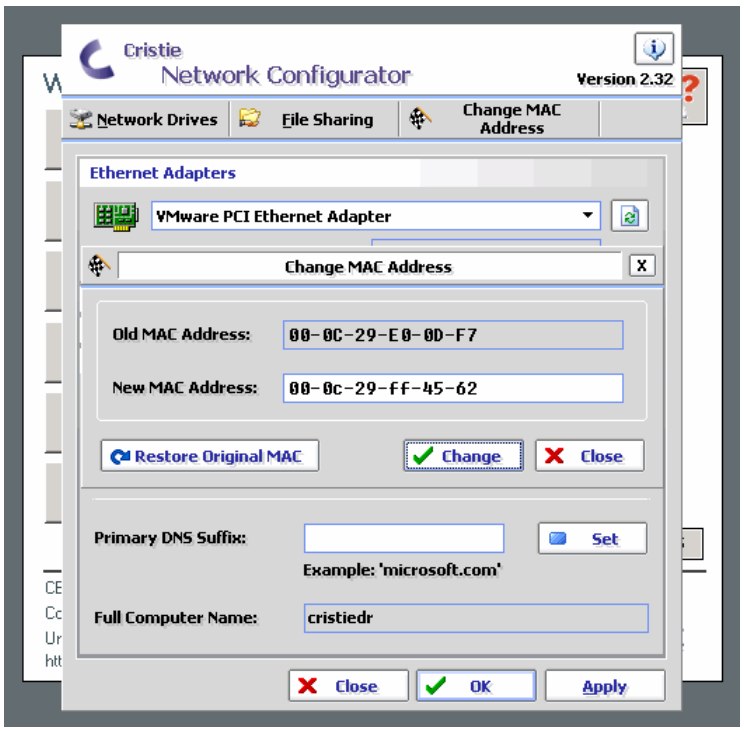


Change MAC Address

It is possible to change the local MAC address of the recovering system. Select the Change MAC Address button. Note that the new MAC address is transient and only apply while the WinPE DR session is running. They are not applied to the recovering system when it reboots after the DR session.



This results in the following display.



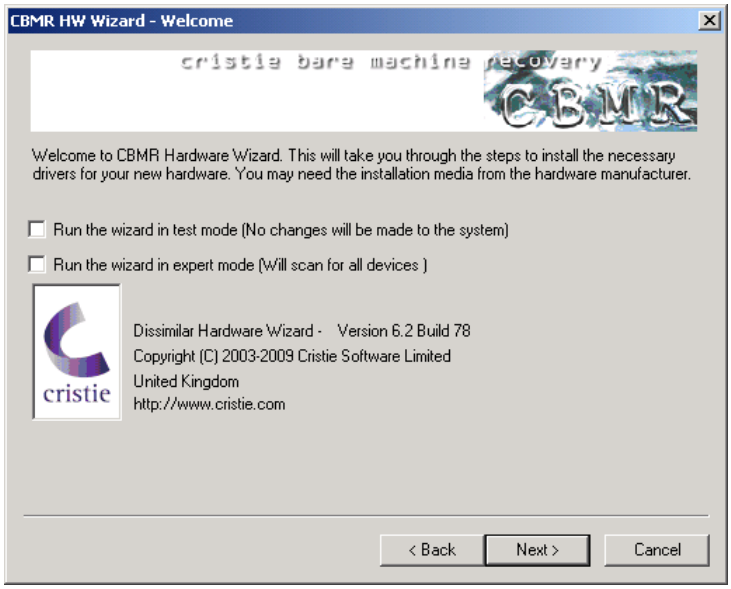
Note that the original MAC address can be restored at any time.

Dissimilar Hardware Wizard

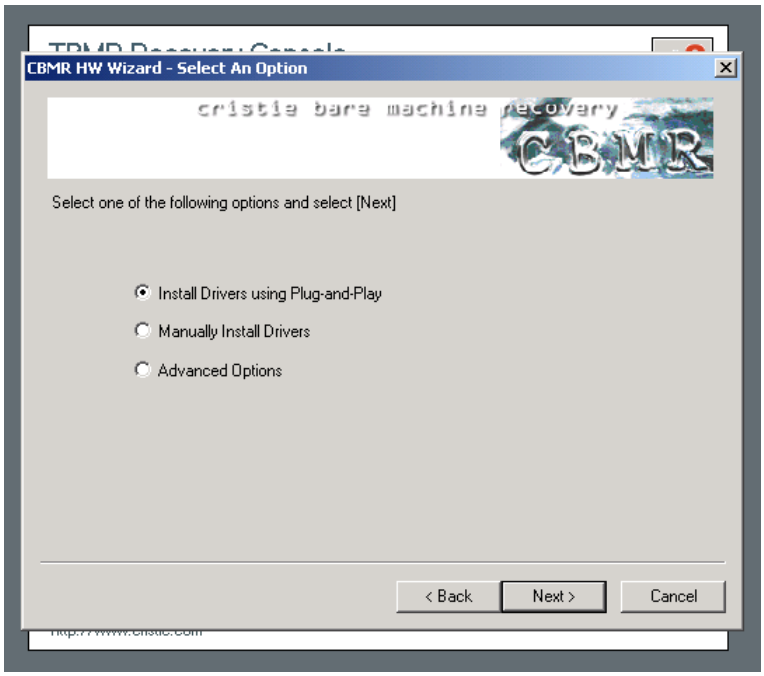
The Dissimilar Hardware Wizard can be used to load Windows drivers onto the recovering machine. It is only necessary to load the drivers for the hard disk and the CPU/HAL. Drivers for the hard disks can be determined by Plug-and-Play (PnP) and may be readily identified. However changes required in the CPU model via a change in HAL, cannot yet be determined by PnP; these need to be loaded manually.

The opening menu of the HW Wizard allows an optional test mode to be selected. If this is ticked no changes will be made to the recovered system. This is useful if you just wish to get information on missing drivers for example.

If you wish to scan for just Mass Storage and NIC drivers select **Next>** to continue to the next step of the Wizard. If you wish to scan for all drivers tick the "run the wizard in expert mode" box before selecting **Next>**.

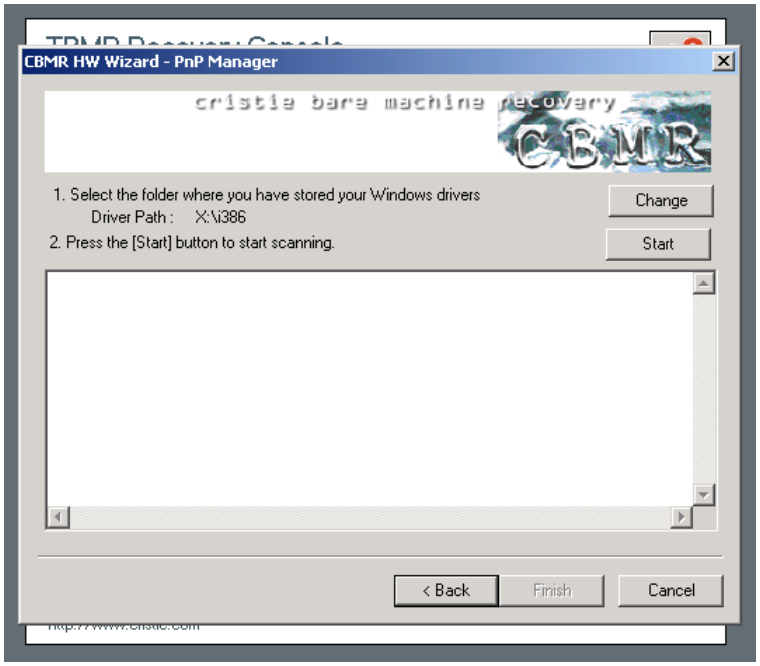

CBMR HW Wizard - Welcome
cristie bare machine recovery
CBMR
Welcome to CBMR Hardware Wizard. This will take you through the steps to install the necessary drivers for your new hardware. You may need the installation media from the hardware manufacturer.
Run the wizard in test mode (No changes will be made to the system)
Run the wizard in expert mode (Will scan for all devices)
cristie
Dissimilar Hardware Wizard - Version 6.2 Build 78
Copyright (C) 2003-2009 Cristie Software Limited
United Kingdom
http://www.cristie.com
< Back
Next >
Cancel

So to install drivers for hard disks, select the Plug-and-Play option.

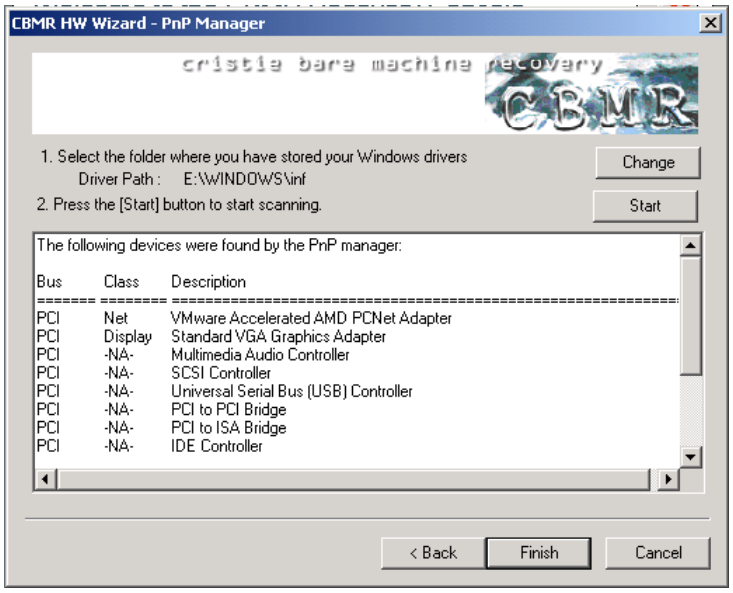


Install Drivers using Plug-and-Play

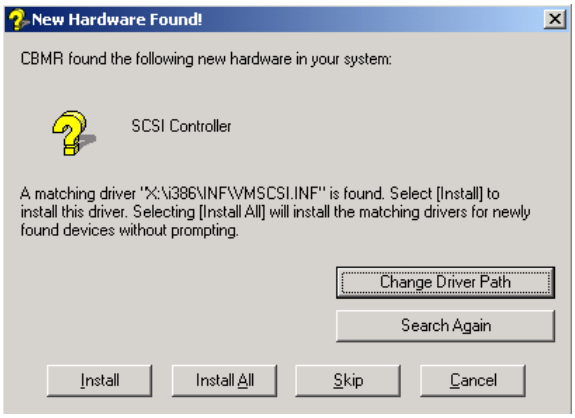
The window appears empty to start with. The set of drivers located on the recovery CD is the default choice. It is possible to change this to a network share or another CD with the **Change** command button. Begin the PnP driver detection by clicking **Start**.



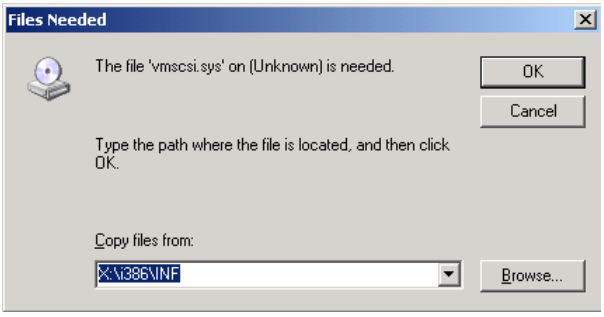
The process checks the devices that it can detect and when it finds one that does not have a driver loaded, it will offer to install it.


CBMR HW Wizard - PnP Manager
cristie bare machine recovery
CBMR
1. Select the folder where you have stored your Windows drivers
Driver Path : E:\WINDOWS\inf
Change
2. Press the [Start] button to start scanning.
Start
The following devices were found by the PnP manager:
Bus Class Description
PCI Net VMware Accelerated AMD PCNet Adapter
PCI Display Standard VGA Graphics Adapter
PCI -NA- Multimedia Audio Controller
PCI -NA- SCSI Controller
PCI -NA- Universal Serial Bus (USB) Controller
PCI -NA- PCI to PCI Bridge
PCI -NA- PCI to ISA Bridge
PCI -NA- IDE Controller
< Back
Finish
Cancel

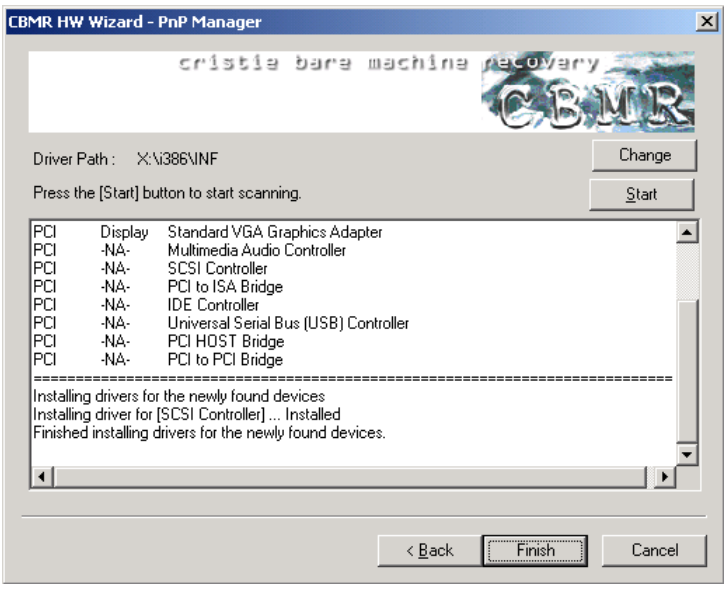
The wizard identifies the source of the Windows drivers. You may change the path to these .inf files and click **Search Again** to make it use the new path. Once you are satisfied that the path is correct click on **Install** and the driver will be installed.


New Hardware Found!
CBMR found the following new hardware in your system:
SCSI Controller
A matching driver "X:\i386\INF\VMSCSI.INF" is found. Select [Install] to install this driver. Selecting [Install All] will install the matching drivers for newly found devices without prompting.
Change Driver Path
Search Again
Install
Install All
Skip
Cancel

Drivers are usually .sys files. The .inf files define which driver files need to be loaded for a given device. You may need to confirm the location of the driver files for each device, or possibly find the path where they are stored. When you have the correct path, click on **OK** and the wizard will look for more.

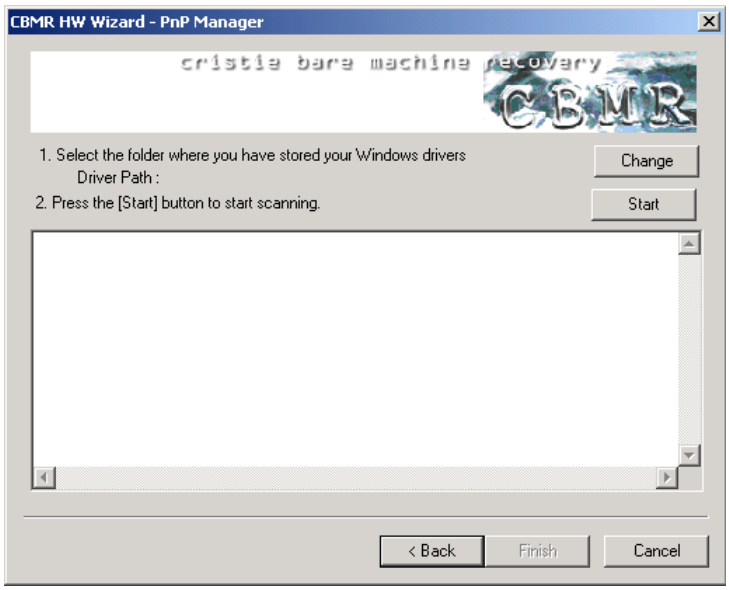


Once all of the drivers of the detected devices have been processed, the wizard will indicate that the installation has finished. Click on **Finish** to proceed.

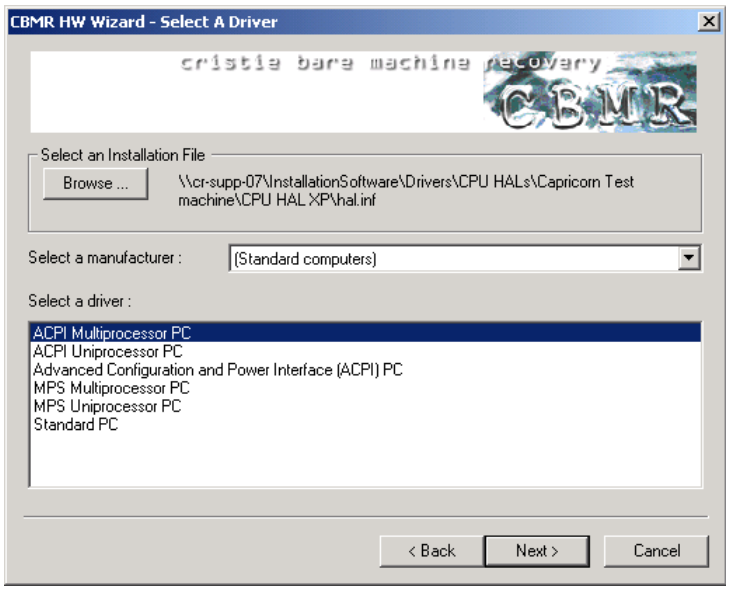

CBMR HW Wizard - PnP Manager
cristie bare machine recovery
CBMR
Driver Path : X:\i386\INF
Change
Press the [Start] button to start scanning.
Start
PCI Display Standard VGA Graphics Adapter
PCI -NA- Multimedia Audio Controller
PCI -NA- SCSI Controller
PCI -NA- PCI to ISA Bridge
PCI -NA- IDE Controller
PCI -NA- Universal Serial Bus (USB) Controller
PCI -NA- PCI HOST Bridge
PCI -NA- PCI to PCI Bridge
Installing drivers for the newly found devices
Installing driver for [SCSI Controller] ... Installed
Finished installing drivers for the newly found devices.
< Back
Finish
Cancel

Manual Installation

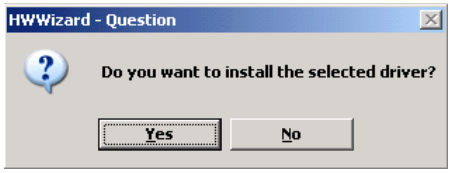
Normally you would only manually install a driver for a CPU/HAL change. Select **Browse**.



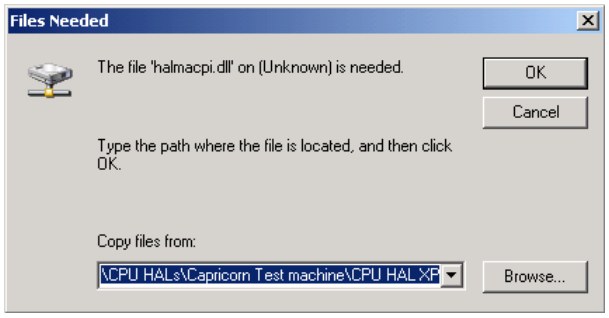
Find the driver that you need by browsing to the appropriate folder that holds the .inf file for the driver you wish to load. If you need to load the driver from another machine, then you can browse to a share on that machine and then to the appropriate folder.



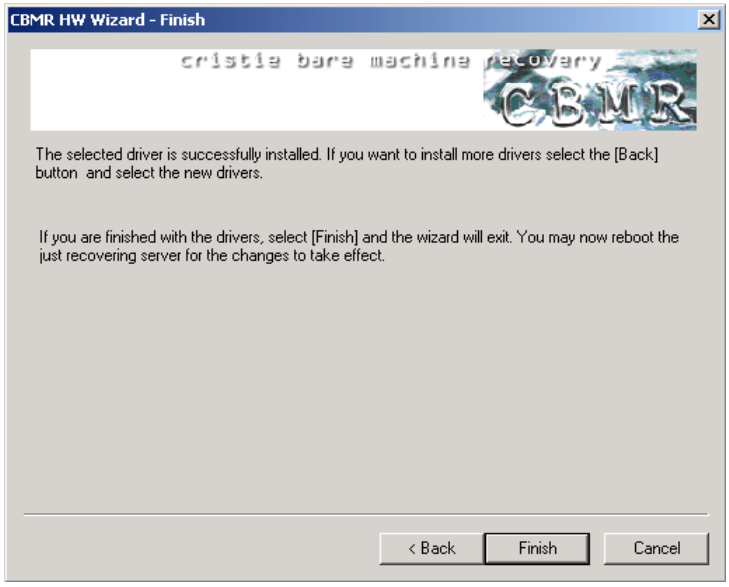
The wizard allows you to select drivers that are grouped by manufacturer. Select the actual driver that you wish to install and click **Next>**.



After you confirm the selection, the wizard determines which files need to be installed. You are given the opportunity to change the location from which they are loaded.

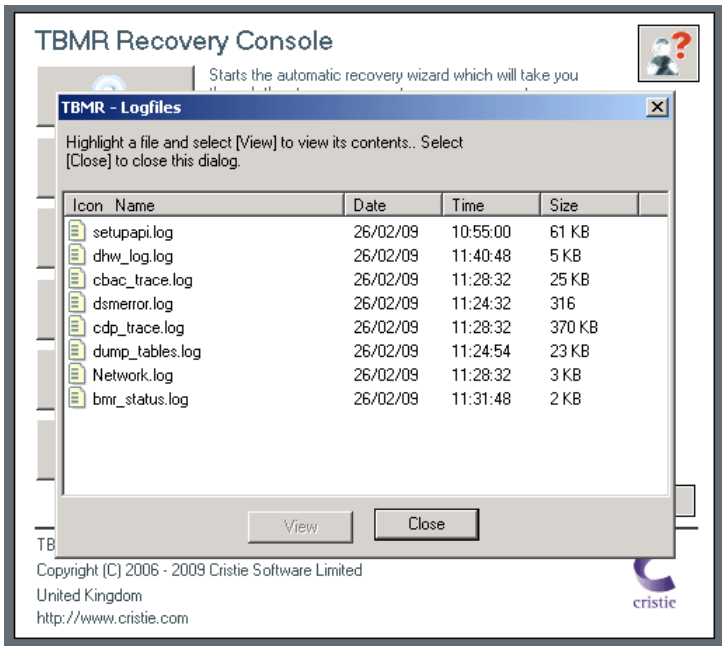

Files Needed
The file 'halmacpi.dll' on (Unknown) is needed.
OK
Cancel
Type the path where the file is located, and then click OK.
Copy files from:
\CPU HALs\Capricorn Test machine\CPU HAL XP
Browse...

When the drivers have been installed, the wizard allows you to go back and do another one or finish the process.


CBMR HW Wizard - Finish
cristie bare machine recovery
CBMR
The selected driver is successfully installed. If you want to install more drivers select the [Back] button and select the new drivers.
If you are finished with the drivers, select [Finish] and the wizard will exit. You may now reboot the just recovering server for the changes to take effect.
< Back
Finish
Cancel

4.1.6 Show Log and Error Reports

This main menu option allows the log files produced during the recovery to be viewed using notepad. Normally viewing this information is only required to diagnose a problem with the recovery.


TBMR Recovery Console
Starts the automatic recovery wizard which will take you
TBMR - Logfiles
Highlight a file and select [View] to view its contents.. Select [Close] to close this dialog.
Icon Name Date Time Size
setupapi.log 26/02/09 10:55:00 61 KB
dhw_log.log 26/02/09 11:40:48 5 KB
cbac_trace.log 26/02/09 11:28:32 25 KB
dsmerror.log 26/02/09 11:24:32 316
cdp_trace.log 26/02/09 11:28:32 370 KB
dump_tables.log 26/02/09 11:24:54 23 KB
Network.log 26/02/09 11:28:32 3 KB
bmr_status.log 26/02/09 11:31:48 2 KB
View
Close
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United Kingdom
http://www.cristie.com
cristie

dsmerror.log - ITSM interface log information

bmr_status.log - restored disk and registry configuration log, e.g. disks/partitions created summary etc.

dhw.log - contains a summary of Dissimilar Hardware Wizard activites. Used by Cristie Support for diagnosing new driver problems.

setupapi.log - contains a summary of the Plug and Play devices detected by WinPE as it boots. Used by Cristie Support for diagnosing WinPE driver problems.

cdp_trace.log - contains a detailed summary of how the partitions were restored. Used by Cristie Support for diagnosing disk configuration problems.

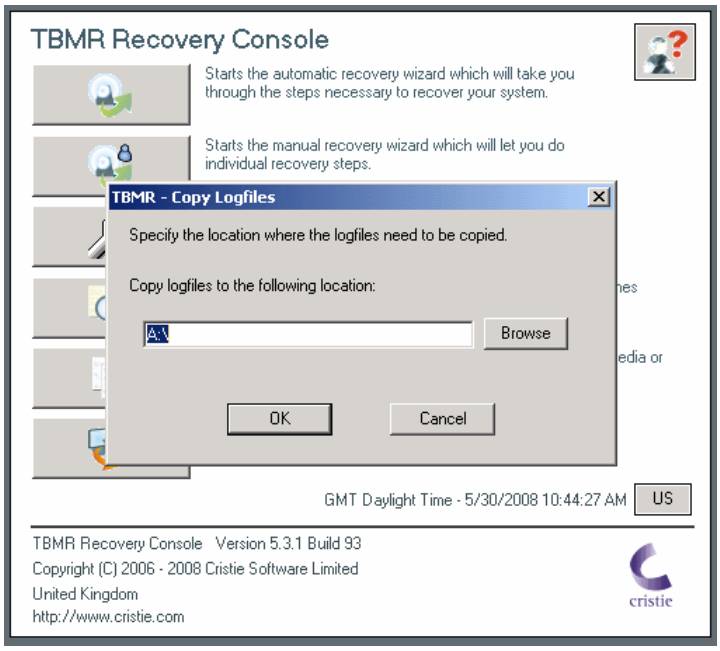
dump_tables.log - contains a detailed summary of internal disk parameters. Used by Cristie Support for diagnosing disk configuration problems.

cbac_trace.log - contains a detailed summary of the Cristie configuration access process and TSM filespace recoveries. Used by Cristie Support for diagnosing recovery problems.

network.log - contains a detailed summary of the network configuration details used during DR. Used by Cristie Support for diagnosing recovery problems.

4.1.7 Copy Log and Error Report Files

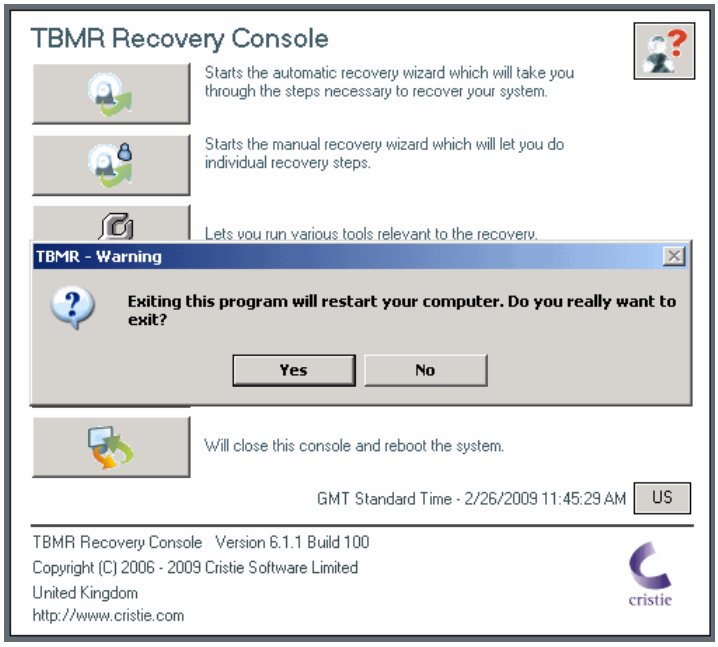
Since all log and error files generated during the recovery are only transitory (i.e. they are lost as soon as the Windows PE environment exits), this option allows you to copy the to a local device or remote network share for permanent record. Use the Cristie Network Configurator Tool , http://www. to setup a network share.


TBMR Recovery Console
Starts the automatic recovery wizard which will take you through the steps necessary to recover your system.
Starts the manual recovery wizard which will let you do individual recovery steps.
TBMR - Copy Logfiles
Specify the location where the logfiles need to be copied.
Copy logfiles to the following location:
A:\
Browse
OK
Cancel
GMT Daylight Time - 5/30/2008 10:44:27 AM
US
TBMR Recovery Console Version 5.3.1 Build 93
Copyright (C) 2006 - 2008 Cristie Software Limited
United Kingdom
http://www.cristie.com
cristie

The example shows files being copied to a local floppy drive.

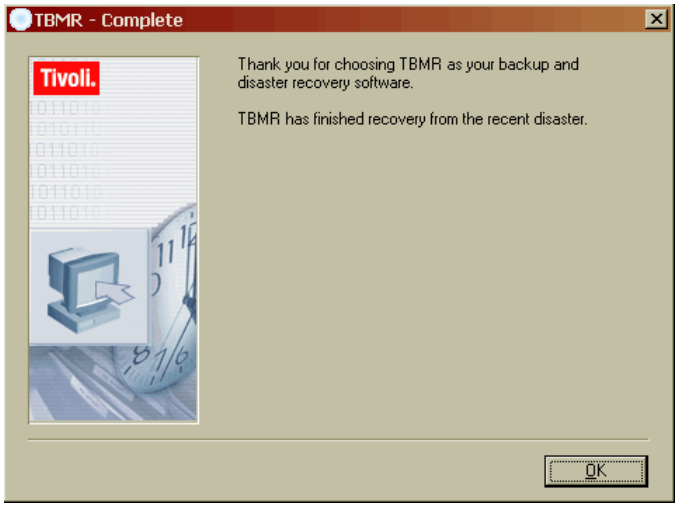
Note that the logs are automatically written back to the recovered system after a successful DR. They are saved to the TBMR installation sub-folder *Temp*.

4.1.8 Close Recovery Console and Reboot


TBMR Recovery Console
Starts the automatic recovery wizard which will take you through the steps necessary to recover your system.
Starts the manual recovery wizard which will let you do individual recovery steps.
Lets you run various tools relevant to the recovery.
TBMR - Warning
Exiting this program will restart your computer. Do you really want to exit?
Yes
No
Will close this console and reboot the system.
GMT Standard Time - 2/26/2009 11:45:29 AM
US
TBMR Recovery Console Version 6.1.1 Build 100
Copyright (C) 2006 - 2009 Cristie Software Limited
United Kingdom
http://www.cristie.com
cristie

After a successful recovery, select this option to exit the Windows PE environment and boot the recovered system.

Press **Yes** to the restart confirmation warning or **No** to continue running the DR console. If you choose to reboot the recovered Windows system will start.


TBMR - Complete
Tivoli.
Thank you for choosing TBMR as your backup and disaster recovery software.
TBMR has finished recovery from the recent disaster.
OK

The above dialog is displayed when the recovered system re-starts and shows the successful completion of the Disaster Recovery.

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